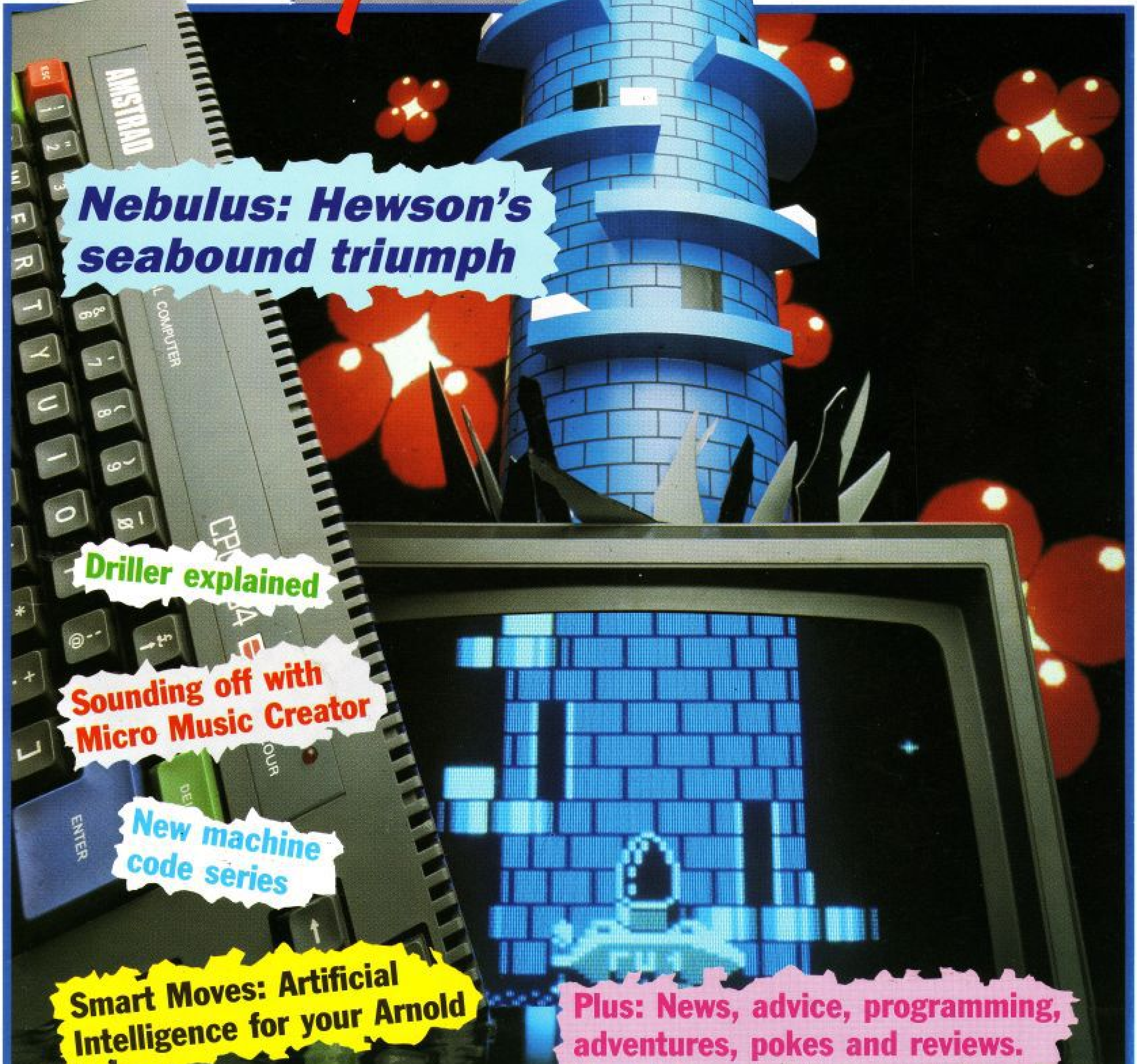
June 1988 £1.25

AMSTRAD Computer User



Nebulus: Hewson's seabound triumph

Driller explained

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You can almost feel the tension of the big match breaking through the screen . . . the expectant crowd is almost on top of you! You return the service with a Top-spin Backhand, then a Forehand Back-spin, the ball bounces high from your opponent's looping, defensive lob . . . SMASH! . . . a great shot opens the score . . .
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AMSTRAD Computer User

The official magazine for all users of Amstrad computers

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Our first visit to the fabulous Great Hall at Alexandra Palace was an OUTSTANDING success.

AMSTRAD COMPUTER SHOW

So for our May show there'll be . . .

- ★ **More stands** (lots more to try and buy)
- ★ **More space** (a much bigger floor area)
- ★ **More savings** (special offers galore)

THURSDAY	FRIDAY	SATURDAY
MAY 26	MAY 27	MAY 28
10am-6pm	10am-6pm	10am-6pm



1968 AMSTRAD 1988 20 YEARS ANNIVERSARY

Help celebrate Amstrad's 20th anniversary at the 10th Amstrad Computer Show – the biggest event of its kind ever held. This is the show where both beginners and experienced users can find the answers to all their questions. A **Computerised Product Locator** will give visitors an instant guide to which stands have products they want to see. An **Expert Advice Centre** will be staffed by some of Britain's top computer professionals. And **Demonstration Areas** will enable you to see the very latest software in action.

A great day out for all the family!

The NEW Alexandra Palace is at the heart of a vast leisure complex, with a magnificent panoramic view over the capital. While you're at the show the rest of the family can enjoy the wooded park, the boating lake, the children's play centre and zoo, and the park's own garden centre. And new facilities completed since the last show include a large, fully-licenced restaurant, bars and snack areas, and the tropical Palm Court leisure area with its exotic trees and fountains. There's extensive car parking too – and all of it is free.

Bring this coupon to the Show to get 50p per person off the normal admission price of £3 (adults), £2 (children).

50p OFF

10am-6pm Thursday, May 26
10am-6pm Friday, May 27
10am-6pm Saturday, May 28

AMSTRAD COMPUTER SHOW

Alexandra Palace, London N22

A416

4 88(20)

NEWS
Computer User

Doughnuts to dambusters

THE Power House has concluded a deal with Canadian software company Sydney Development Corporation.

SDC responsible for Dambusters and Desert Fox on the CPC, is based in Vancouver but has offices in Los Angeles, New Jersey, Toronto, Nottingham and London.

The company, as it now stands, was formed in 1978 but had previously been under different ownership when it was first into mining, and then a doughnut factory.

Dambusters and Desert Fox have now been re-released for the CPC on The Power House's £1.99 budget label.

Dream of fear

THE latest release from Cascade Games, Frightmare, comes from beyond your darkest dreams.

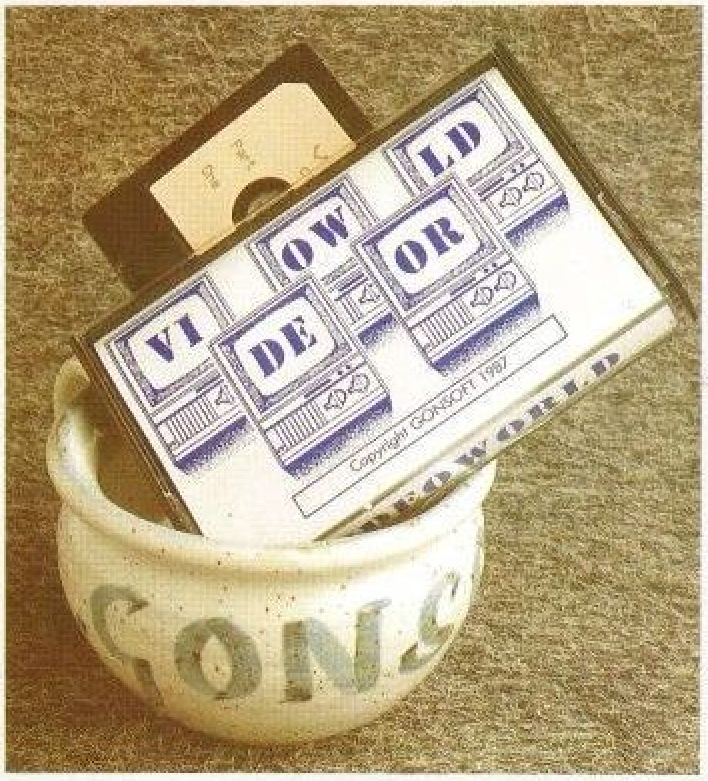
The game will take you into your subconscious as you float from screen to screen collecting the ancestral dreams and fears that



hide in the deepest parts of your mind.

Even Grotbags of BBC TV's Pink Windmill Show thinks it is truly frightening: "Just like me," she says.

Frightmare is due for release on the CPC very shortly priced £9.95 cassette, £14.95 disc.



Win £100 and a potty to put it in

ARE you potty enough to solve Videoworld, the highly original text adventure from Gonsoft, and win pots of money?

Any registered purchaser of Videoworld will be eligible for the competition, and the first person to send in the complete solution to the game will win £100 plus the unique, hand-crafted Gonsoft Potty award.

As a chamber pot plays an important role in Videoworld, Gonsoft thinks it would be appropriate to offer a 12in diameter one to the winner.

Further details from Gonsoft on 0603 484426.

Bites not bytes

VAMPIRE's Empire, starring Count Dracula and his bloodsucking cronies, is the new game from Magic Bytes.

You take on the role of the vampire hunter Van Helsing whose first task is to locate the divine light ray which he must reflect and deflect through the underground caverns and hallways.

Not only must Van Helsing deal with his surroundings, but he must also avoid the vampish Sybille who is just aching to give him a deathly love bite.

Adorned with his trusty crystal ball and string of pungent garlic he must locate and kill the count before midnight or it could be all over bar the biting.

The game features a host of grisly characters wandering around over 400 rooms, plus gameplay which constantly takes a comical twist.

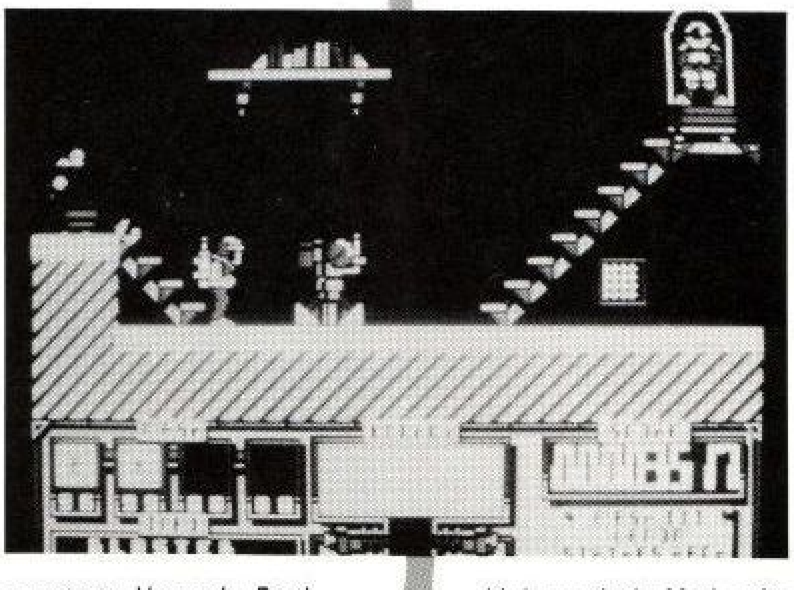
Vampire's Empire will cost £9.99 on cassette and £14.99 on disc.

Son of Mask hero kidnapped!

VENOM have kidnapped Scott Tracker and are holding him hostage in their moon HQ. Miles Mayhem has demanded the surrender of Mask in return for Scott's life.

Unable to agree to this, Scott's father, Matt, has set out alone to rescue him.

As none of the Mask vehicles are capable of space travel, Matt will have to



penetrate Venom's Earth stronghold to steal a moon rocket. This will alert Venom to his rescue plan.

Venom Strikes Back, the third game in the Mask series from Gremlin Graphics, is available now priced at £9.99 on cassette and £14.99 on disc.


PLATOON
The first casualty of war is innocence.
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ORIGINAL MOTOWN RECORDING OF "TRACKS OF MY TEARS" BY SMOKEY ROBINSON
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Olympic double bill

THE biggest sports events this spring are the Pogostick Olympics from Silverbird, and the Alternative World Games from Gremlin Graphics.

Silverbird's test of nerves and stamina will have you bouncing and bursting your way through obstacle courses, the long jump, high jump, triple jump, hurdles, and many others – all on a pogostick.

On your head is a helmet; on the helmet is a spike; floating above you are balloons which you have to pop at the same time as competing against the clock to qualify for a higher level.

Gremlin's Alternative World Games are hosted by the resident parrot. Up to eight players are each able to choose one of 18 countries to represent.

Each game – boot throwing, sack racing, pole climbing, and running up walls, to name but four – takes place in a different location, with the emphasis very much on having fun. Even the parrot provides enlightening squawks and screeches during the events.

So if you can't wait for the real thing in the summer, you've got no excuse for sitting around moping.

Silverbird's Pogostick Olympics is out now priced £1.99.

The Alternative World Games is also out now priced £9.99 cassette, £14.99 disc.



Gremlin's Alternative World Games

Driller II

DETAILS have emerged about Dark Side, Incentive's much awaited sequel to Driller.

The game is set 200 years on from the Driller era, in which time the Ketars, Evath's exiled criminal race, have grown strong and even more devious.

On the dark side of Tricuspid, the sister moon to Mitral, a giant weapon, Zephyr One, has been constructed with the intention of blowing the planet Evath to bits.

Wearing a futuristic jet power spacesuit, your main objective is to stop the destruction.

Dark Side, which incorporates the 3D Freescape graphics system and many new features, is out in May priced £9.95 cassette, £14.95 disc.

South Sea strategy

CARRIER Command from Rainbird is being hailed as the ultimate strategic shoot 'em up.

At the helm of a futuristic aircraft carrier equipped with fighter planes and amphibious assault tanks, protected by passive defence drones placed strategically around the ship, your task is to battle with an enemy to take control of a group of 25 islands.

Carrier Command will be out on the CPC in the early summer.

ROMANTIC ROBOT *present*

1988 – THE YEAR OF THE ROBOT



Q: WELL, I'VE HEARD OF THE YEARS OF THE CAT, PIG, AND EVEN DRAGON – BUT THE YEAR OF THE ROBOT?

A: Absolutely! And ROMANTIC ROBOT wish to make 1988 a truly memorable year (if not us, who will?). To kick off with, there is an INTRODUCTORY OFFER OF **£29.88** ON RODOS, plus a truly unique 1988 SPRING MAIL ORDER PRICE OF MULTIFACE TWO – **£42.88!**

Q: I LOVE SALES. BUT WHAT'S SO LIKEABLE ABOUT RODOS and MULTIFACE?

A: RODOS is too powerful and complex to be summed up here – please send a SAE for full info. MULTIFACE is (simply) a MUST for ANY CPC owner: it can copy and change programs as you wish.



Q: OH, DO I NEED TO DO ANY PROGRAMMING TO MAKE BACK-UPS?
A: NO! – NOT with the MULTIFACE TWO – it is in fact the ONLY product on the market which works FULLY AUTOMATICALLY. You LOAD any program as usual, RUN it for as long as you like and when you wish to make a copy you just press the MULTIFACE's red button and follow the menu and on-screen instructions.

Q: HOW DOES IT WORK THEN? IS IT EASY? USER-FRIENDLY? ERROR-TRAPPED? IDIOT PROOF? GUARANTEED?
A: YES! It works a treat and it could not be easier. The menu gives four basic options – to **SAVE** a program, to **RETURN** to continue it, to **JUMP** (say to your own routines – invaluable for hackers) and **TOOL** to access the MULTI-TOOLKIT set of built-in utilities. For example pressing **S** to **SAVE** will first allow you to **NAME** the back-up and then let you save a **PROGRAM** or just a **SCREEN** to **TAPE** or **DISK**. Before the saving itself, MULTIFACE compresses the program so that it takes the least amount of space on tape/disk and will re-load as quickly as possible. Once a program is saved, you can **RETURN** or **JUMP**, use the **TOOLKIT** to change it, **SAVE** it again, etc.

Q: DON'T YOU CORRUPT THE SCREEN WITH YOUR MENU, INSTRUCTIONS, PULL DOWN WINDOWS, ETC.?
A: NO. MULTIFACE TWO has its own memory (8K ROM & 8K RAM) and a lot more hardware – thus when it finishes its job or when you re-load your back-ups, everything is **FULLY** and **AUTOMATICALLY** restored: screen modes, colours, windows, etc. This is essential and NO OTHER DEVICE CAN DO IT!

Q: OK, SO MULTIFACE CAN COPY FROM **TAPE TO DISC**, *BUT CAN IT DO* **TAPE TO TAPE** *OR* **DISC TO DISC** *OR* **DISC TO TAPE?**
A: Of course it can. MULTIFACE saves either to tape or disc and it saves whatever happens to be in the computer at that time – no matter how you loaded it in.

Q: SO FAR SO GOOD. BUT CAN'T I DO ALL THIS WITHOUT THE MULTIFACE?
A: ABSOLUTELY NOT! First, you need a hardware device, a "magic box", to be able to stop and copy programs AT ANY STAGE – be it upon loading, half-way through the game, etc. Tape/disc copiers can only try to copy programs BEFORE they load: if there are unorthodox loaders, speedlocks, protections against copying, etc., you'll end up with a problem – but not with a back-up. Also, with MULTIFACE you can poke infinite lives, ammunition, etc. – and then SAVE.

Q: MULTIFACE IS NOT THE ONLY 'MAGIC BOX' ON THE MARKET – WHY SHOULD I BUY IT MORE THAN ANYTHING ELSE?
A: There are four devices on the market. Action Reply by Datel Electronics, Disc Wizard by Evesham Micros, Mirage Imager and MULTIFACE TWO. Each manufacturer would naturally argue his product is the best buy – fortunately (for you and us), MICRONET recently compared all four units and MULTIFACE TWO came out the best in literally all respects: the most successful one – 100%!, the ONLY AUTOMATIC ONE, the FASTEST ONE both in LOADING *AND* SAVING time, the one taking the LEAST ROOM when saving – and you still get a couple of EXTRAS: a RESET button and an extensive and unique MULTI-TOOLKIT.

Q: MULTIFACE IS IT! THE RIGHT THING IN THE RIGHT TIME! IF ONLY IT PAID FOR ITSELF...
A: But it does! By the time you buy 8 programs on tape instead of disc, you will have saved £40.– the cost of the MULTIFACE. The money you save on further programs is all yours

.... **MULTIFACE worth every penny, saves you pounds!**

Romantic RObot Disc Operating System

Just one ROM will turn your CPC into a professional set-up: With RODOS you can attach additional disc drives – 40/80 track, single/double sided and store more than 800k per disc.

RODOS NEW **RR**

But RODOS is in fact much more than a fast and perfect DOS. RODOS also gives you RANDOM ACCESS, PRINTER BUFFER, full ROM manager, SILICON DISC, altogether 54 new bar commands, enormous power – all this and much more for £29.88 only!

multiface two

SPRING MAIL ORDER SALE PRICE £42.88

RODOS

INTRODUCTORY OFFER-ON ROM £ 29·88

The special price of £42.88 applies strictly to mail orders received with the coupon below before the 31st May, 1988

Tape-to-disk at the touch of a button. Ridiculous, you may say, but it works every time. *Multiface* can stop any program in its tracks and save the program from memory to either tape or disk. It's completely fool-proof. Similar products have had problems with screen size, colour and even sound; *Multiface* can handle all these without a second thought.

That alone would have satisfied many people, but Romantic Robot has gone one step further, incorporating a memory editor. No program is safe with this: everything is out in the open, including the Z80 registers, CRTC data and any part of memory.

Don't be fooled into thinking this will result in mass piracy, however. The *Multiface* unit itself must be plugged into your Amstrad to allow reloading of a program it saved.

Multiface II must be the cleverest hardware device at present – a necessity for disk owners who thought they were stuck with loading from tape every time.

AMSTRAD ACTION JANUARY 1987

THE YEAR OF THE ROBOT · BE PART OF IT

I order MULTIFACE 2 (£42.88) ☐/ RODOS (£29.88) ☐ plus p&p UK £1, Europe £2, Overseas £3

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Fill me in

IN most art packages there is an option to save a picture or screen into memory or on to tape/disc. Could you please let me know how this is done. I think they use a binary file, so how can I create one?

Another irritating thing on a 464 is the inability to flood or fill an area with colour. I have seen this done on a 464, so could you let me know if it is possible in Basic.

Daniel Haley,
Bradfield, Berks.

LD: A screen image is saved, as you have guessed, as a binary file. The CPC screen memory starts at &C000 (49152 dec), and is &4000 bytes long (16384 dec). So SAVE "filename",B,&C000,&4000 is the code needed to save the screen. The B signifies that what we are saving is binary data, not a Basic program.

Yes, it is possible to fill areas of the screen in Basic, but it takes such a long time to fill even small areas that an explanation of how to do it would hardly warrant the space required. I'll give you a clue though: You'll need the TEST and PLOT keywords.

Into the unknown

HAVING become the owner of a 6128, using Protext software with a DMP 2000 printer, I am now ready to venture into the area of the two CP/M discs supplied with the computer.

I am quite prepared to admit that my experience in this field is at the moment limited, but I am not able to gain much headway with the user instructions supplied by Amstrad.

Could you recommend a more easily understandable instruction manual that might get me started on the right track?

G.P. Miles,
Orpington, Kent.

LD: The book you want is The Amstrad CP/M Plus. It was published by Newstar, written by Andrew R.M. Clarke and David Powys-Lybbe. It is no longer in print, but can still be found in computer stores and book shops if you look hard enough.

Alternatively, take a look at CP/M The Software Bus, which is mainly about CP/M 2.2 but has many chapters that are relevant to CP/M Plus as well.

At the end of the day though, the only way to learn CP/M is to use it.



Dyslexic Amstrad

I WAS very interested in the letter from Mr B. De-Lara concerning dyslexia. The group I lead has been writing programs to help parents and teachers with dyslexic children since 1980.

For Amstrad CPC464 and later, and for PC1512 and later, we have a suite of some 30 programs covering left/right confusion, sequences, short-term memory, as well as numerous programs for spelling and dictionary work.

All the spelling programs are content free. By that I mean all words are held in DATA statements so that users can practice any words by merely re-typing the few DATA lines at the end.

We aim only to recover our costs, and allow for the inevitable upgrading that must occur as new machines appear. The minimal copying charge of £10 per suite enables us to do this.

The scheme was started using pupils of Mayfield College, and later pupils of St Leonards-Mayfield School.

As well as Amstrad, and of course Spectrum, we cover BBC, RM380Z, and Commodore machines. In the first instance enquirers should send a large sae for full details.

Brother Henry,
Mayfield Computer Dyslexia Group,
Bradley House,
Little Trodgers Lane,
Mayfield,
TN20 6PW.

Cover clanger

Why have you got the joystick the wrong way round on the March front cover?

Ben Coombs,
Swanage, Dorset.

LD: Shhh. If I send you a free game, will you promise not to bring the subject up again?

Spaced out

I have bought my daughter the Amstrad CPC464. I wish to update her bedroom, and make a computer desk. Are there extension leads on the market so I can put the monitor a little further away?

P.Farren,
Burton-on-Trent.

LD: Amstrad do not recommend extending the standard power supply leads from the monitor to the keyboard because this would mean there wouldn't be enough oomph reaching the computer to run peripherals like rom boards and the like.

What you need to do is buy an MP-1 modulator and use this to power the computer. You can then get a long extension for the video lead (the largest of the three plugs), and plug the monitor in separately, across the other side of the room if the extension is long enough.

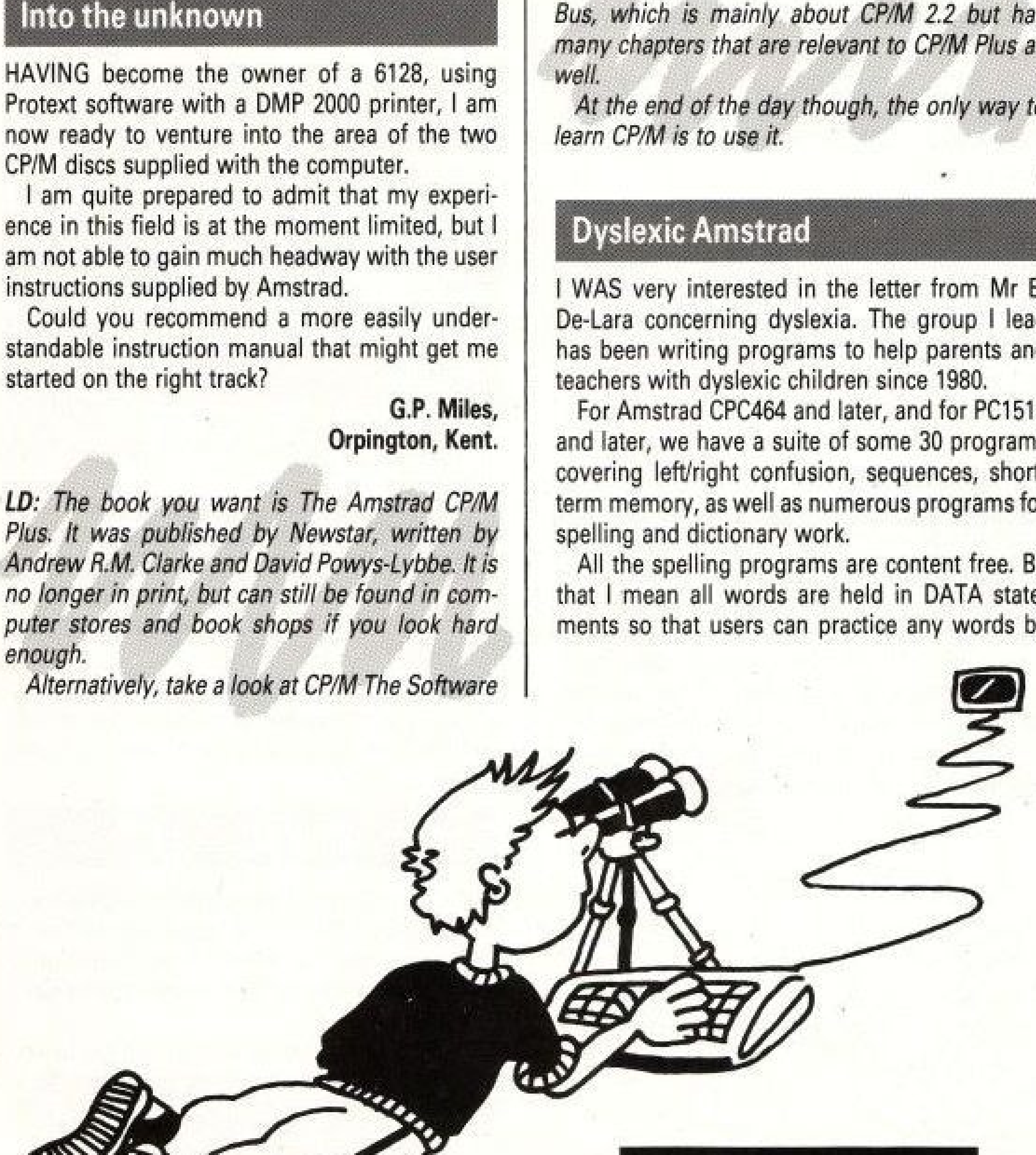
Whatever you do, DON'T plug the now redundant monitor power lead (the one you used to poke into the computer) into the hole in the monitor marked 12V DC. Instead, secure it underneath the monitor with some sticky tape.

Big bad buffer

IN the March *ACU* was a two page review of the MicroStuffer. For some time I had been considering buying a printer buffer, as I do quite a number of graphics dumps and these tend to tie up the computer for a long time.

The review stated that savings on time can be made for graphics dumps, so I decided to buy one.

I found that printing text files was, in terms of



Send your letters to:
Lance Davis
Letters Editor
Amstrad Computer User
169 Kings Road, Brentwood
Essex CM14 4EF

releasing the computer, very fast; 1k of data taking about one second to transfer to the MicroStuffer.

However, I have found that of the graphics dumps I mainly use, only that of The Art Studio gives any appreciable saving, being twice as quick as before.

Utopia's I GDUMP took only 22 seconds less time – a saving of 7 per cent – and a standard Stop Press printout was just 4 minutes quicker, a saving of just over 10 per cent.

These figures show that the MicroStuffer does not always give the hoped for time saving for graphics dumps. Why do Utopia and Stop Press take so long to print?

Mick Ellick,
Bristol.

LD: *You can't blame MicroStuffer, it's just too big a job for it. Perhaps I should try to explain with an analogy.*

Imagine a very big pile of sand on a building site and the foreman has assigned Fred and Bill to shift it 20 feet. As they can't shovel it that far in one go, Bill gets a wheelbarrow and places it 10 feet from the pile. He tells Fred to start shovelling the pile into the wheelbarrow, and when it's full he'll start shovelling it out of the barrow on to the new pile. In the meantime Bill trundles off for a cup of tea.

So Fred is the computer, Bill and his wheelbarrow are the MicroStuffer, and the new pile is the printer.

After a little while Fred fills the barrow, but Bill hasn't returned from his tea break. So, until Bill turns up and starts emptying the barrow, Fred can't shovel any more in. And when Bill does come back, Fred can only shovel sand into the barrow as fast as Bill can shovel it out.

It's the same thing with Stop Press and MicroStuffer. A full Stop Press page has over 504k to send to the printer, so once it's sent its first 64k, it can only send the remaining 440k when MicroStuffer has made space by printing the data that is first in the queue. As a line of data goes out, so Stop Press can send another line of data to MicroStuffer.

How does a mouse?

WHEN a mouse is moved, just how does it work out its direction of movement in relation to its position? Does it retain its start point in its memory? What is the particular basic part of the electronic sensor?

Peter Waters,
West Yorkshire.

LD: *Inside the mouse are two slotted wheels at right angles to each other, one for the x coordinate and one for the y. As you move the mouse, optical sensors keep an eye on the movement of these wheels, and some clever software works out in which direction the mouse has been moved.*

Which language?

I'M looking through the advertisements in your magazine to find a reasonably priced compiler. I am not sure whether to order a Forth or a C one. Which in your opinion is the best language of the two?

R (can't read the signature),
Harrogate,
N.Yorks.

LD: *Which is better, a cow or a horse? Well, if you want a glass of milk I guess a cow is better. There again, if you want to get across open countryside in a hurry, a horse would be faster.*

Your question poses the same problem. C is currently in fashion, but Forth is very powerful and will definitely be here for a few more years to come.

My advice is to seek out a user club that has some public domain language compilers. You can then try out the languages cheaply before parting with large amounts of money for a professional quality compiler.

What do you expect for £20?

With reference to the review of the John Morrison Pascal Compiler Rom in your March issue, may I heartily concur with Jeff Walker's findings.

I was one such unfortunate taken for a ride by the advertisement in your rival magazine, and when I phoned John Morrison to complain about the lack of a floating point he commented: "What do you expect for £20?"

He did not seem to have any inhibitions about the negative aspects of his product, or the very poor teaching offered in the literature accompanying the rom.

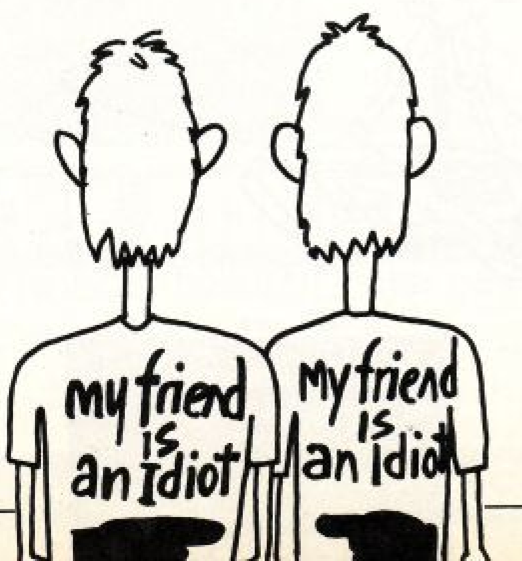
I have now written to the Advertising Standards Authority, and hopefully something will be done about it.

While I am on the subject, is it possible to include from time to time listings in Pascal, and is there such a thing as a Amstrad Pascal Users' Club?

R.H. Williams,
Dagenham.

LD: *Although the Advertising Standards Authority do the best they can, they don't really have any teeth. Try contacting your local Office of Fair Trading if you really want to change the world.*

Programming in other computer languages didn't score highly in our last survey, whereas programming in Basic did. Sorry, there just isn't the interest in Pascal these days. Perhaps that's why there isn't an Amstrad Pascal User Club.



AMSTRAD

AMSTRAD Computer User

Eye Spy

I HAVE noticed a distinct similarity between your organ and Amstrad plc. Are you by any chance related? I think we should be told.

E.Strobes,
pp Lord Gnome,
Dagenham.

LD: Amstrad Computer User *is the official Amstrad magazine, but is no longer owned by Amstrad plc.*

Two heads, no brains

MY friend has a Spectrum 128k computer, and we were talking about our computer magazines the other day. I got out one of mine *(ACU)* and he read some of it. His first words were, "What a rip off. My Sinclair magazine is only a pound and it's much better."

Then I read his magazine. And he's right – it's much better! Why? And what do you intend to do about it?

Graham Dix,
High Wycombe.

LD: *The price of ACU went up because we thought if another Amstrad magazine that isn't as good as ours can get £1.25, then why can't we?*

Check on spelling

WITHIN the last year I have joined college to learn more about databases, spreadsheets and word processors. Having learnt all this I thought I would buy the Mini Office II on disc, as this has it all.

I have a disc drive as well as a datacorder. I have a problem with my spelling. I would like to know if there is a spelling checker for the Mini Office II or for the easy Amsword (given free with the 464).

I have all I need for my computer, like disc drive, and printer and lots of discs and tapes.

Could you please tell me the best art or design

disc or tape to buy for my computer as there are so many and I am not too sure which is the best.

Graham Hodge,
Birmingham.

LD: For a spell checker look at Prospell from Arnor (0733) 239011. It works on the text files independently of the word processor or will integrate with Protext. The golden oldie Screen Designer is the best buy for a 464 owner. Art Studio is 6128 only.

Club all at sea

AS I hope to move north of the border in the near future, I am tying up any loose ends left in Worthing. One of these is the Worthing and District Microcomputer Club, of which I was the last secretary.

The club started out as a computer enthusiasts' group, but was gradually taken over by computer games players. When the games craze crumbled, the club was left with few members and a very small bank balance.

In an attempt to restore it to its former glory we held a car boot sale to raise extra funds. Unfortunately the sale was rained out, and we lost money.

The club remains now in name only. If any Worthing reader wishes to relaunch it, I would be pleased to hand over all the old papers and membership lists.

Robert Watts,
6 Ludlow Court,
105 Brighton Road,
Worthing,
BN11 2EG.
Phone: 0903 37100

Design fault

I WOULD like some information on where I could get my hands on a good building design program which would utilise the full power of my 6128 and mouse. It would need to have some way of producing scaled drawings which I could dump to a printer or a plotter.

There are programs on the market, but I have not found one to suit my need. These programs have no way of scaling out measurements on screen or printout.

S.J.J. Perkins,
Omagh, N.Ireland.

LD: The only thing I can think of that may suit your requirements is Amx 3D Zicon from Advanced Memory Systems. It's not exactly what you want, but if you phone AMS on 0925 602690, I'm sure there will be someone there who could either advise you or send you some bumpf on it.

Antipodean Amster

LIKE Colin Coe, whose letter was published in the December issue of your magazine, I am struggling as an Amstrad user in the backwaters of the Empire. I never cease to be amazed at the difference in prices of both software and hardware in this far flung antipodean outpost.

Even in the enlightened age of our bicentenary, I marvel that a magazine that I can buy on the news stand at the equivalent of £21 would cost me £40 for an annual subscription. But when it comes to software, the converse applies, with prices anything up to 60 per cent below the local currency.

While I accept the editor's suggestion to Colin Coe that the benefits of the "old dart" can be achieved by moving from this outpost of civilisation, I am writing to ascertain if membership of your Amstrad Users Club, and the benefits that accrue from such membership, are available to such as myself in this far bastion of the Commonwealth.

I eagerly await the attempts of Her Majesty's mail to get your response to my home. If it is in the affirmative, would you also indicate whether payment by Mastercard is an acceptable means of renumerating your company.

David A. Devenish-Meares,
Australia

LD: The Official Amstrad User Club, which has now completely separated from Amstrad Computer User, *will only accept Australian members if you have an address in the UK to which they can send the magazine. They do accept Access Mastercard.*

PD Algol

IN reply to Andrew Rigby's letter in the April edition concerning an Algol compiler, he can get one from The CP/M User Group, 72 Mill Road, Hawley, Dartford, DA2 7RZ.

Now that is out of the way, can anyone tell me where I can get a PL1 compiler?

M. Woodbridge,
Ashford, Middlesex.

Treasure Hunt boob

Treasure Hunt will not run. On the screen I get ERROR in LINE 3150. Please help.

N.R. Meakin,
Ealing.

LD: Change line 2210 of the listing to read 2210 RESTORE 2310:ln=2310 and the line number reported in the error message will then be the one your typing mistake is really in.

The Editor, in his unfathomable wisdom, decided to renumber the listing before publishing it, hence the mysterious reference to line 3150.

In pursuit of Trivial discs

I NEEDED one of the further question packs promised in the Trivial Pursuit game documentation, so I went back to the local dealer who sold me the game. He had plenty on cassette, but none on disc.

He has managed to telephone Domark to enquire and has received the answer that the packs are "readily available – talk to your rep". Meanwhile, the rep assures the dealer that they are only available on tape, and try as I might I have been unable to copy the question files from tape to disc.

Do you know, or can you find out, whether there really are any disc packs of extra questions? And if so, where can I buy them?

M.J. Walters,
Hemel Hempstead.

LD: The question packs are readily available on disc, but only by mail order direct from Domark themselves. They cost £7.95 each. Phone Domark on 01-947 5626 for further details.



Launch pad for people in a hurry

Auntie John may be one register short of a CPU, but the CPC firmware routines are his recipe for fame and success as this new series starts

GREETINGS to you all. Allow me to introduce myself – I am Auntie John and it is my honour, nay privilege, to have a chat with you about machine code, firmware calls and interesting stuff like that. Make no mistake, machine code is a very interesting subject. Only last week I was talking to Una (a very pretty girl) about return stacks and the like, when she said "You really are boring, aren't you?"

It was clear to me that under this facade of scorn, she was secretly enthralled and almost overwhelmed with admiration for my knowledge of Zilog op-codes.

So, my little nephews and nieces, it is with this in mind that we shall explore the workings of the Z80.

Never again will you sit alone in the corner at parties; never again will people refer to you as "The dull kid with glasses and acne"; never again will you be stuck for things to do in the bath; never again will you be stuck for a witty reply in an argument ("Oh, go and shift your accumulator, you jumped up system bug!") – now you can woo the boy or girl of your dreams with little machine code poems left on their doorsteps.

Yes, it's the answer to life, the universe and how to get published in magazines... it's...

Firmware jumpblocks

As well as being almost phenomenally exciting, machine code is very useful if you want things done in a hurry. Writing a program to move lots of graphics around, or to run very quickly, is almost impossible in Basic, a language which, while begin relatively easy to learn, is extremely slow.

Speed is the main reason people give themselves brain damage learning machine code, but it also allows you to get to grips with all the little intricate fiddly bits of the machine's hardware.

An easy way to get to grips with machine code is to compare it with a high level language like, say, Basic. In this context you can say machine code has eight or so integer variables (A,B,C,D,E,F,H,L) which can hold values from 0 to 255. By linking two of these variables together (HL, DE, BC) you have three new variables that can hold values from 0 to 65535.

Here are some Z80 machine code assembly mnemonics and their high-level (or pseudo-code) equivalents.

```
LD HL,3000    -->    LET HL=3000
LD DE,2000    -->    LET DE=2000
ADD HL,DE     -->    LET HL=HL+DE
INC HL        -->    LET HL=HL+1
DEC HL        -->    LET HL=HL-1
LD A,L        -->    LET A=L
```

When planning a machine code program it is sometimes a good idea to write it out in psuedo-code first, just to get the idea in a form you can easily understand. But you must make sure to remember that you are only allowed to do certain things with these registers, namely:

- Load them with values.
- Add and substract them.
- Perform logical operations on them.
- Compare them.

You might think all this is a bit limiting. How for example could we print a letter A to the screen? Well, this is where the Amstrad operating system firmware specification and a decent assembler package comes in (I didn't say being popular was going to be cheap).

An assembler is a special program that converts assembler mnemonics into the actual machine codes. If you want to drive yourself completely crazy, you can do without an assembler and just play with these code numbers, but it can't be emphasised enough that a good assembler is essential if you want to learn machine code and stay sane.

If you were to have a browse through the wondrous ring-bound tome of knowledge called SOFT 968, you might find something like this:

> 30:TXT OUTPUT #BB5A
>
> Output a character or control code to the Text VDU
>
> (and lots of technical looking stuff)

Looking at the entry conditions, you would see that you simply load the A register with the Ascii value of the letter you want to print, and – Hey Tesco – you call the magic number BB5A and the letter appears on the screen.

Listing I does just this. You must type it into an assembler (not the psuedo-code – just the assembler mnemonics), or, if you don't have an assembler yet (subtle hint), you can type in the Basic listing instead, which POKEs the machine code directly into memory and then executes it.

Pretty exciting stuff, I'm sure you'll agree – how many times have you wanted a letter A to appear in the middle of your program? But wait, here comes the breathtaking bit – it doesn't have to be the letter A! No kidding, you could print any letter you want. Isn't that amazing? Now sit down and get your breath back, because there are more shocks to come.

So, what exactly is the firmware jumpblock?

```
LET A=65
CALL PRINT TEXT ROUTINE
RETURN TO BASIC
```

Pseudo-code

```
ORG &8000
.TXT_OUTPUT EQU &BB5A
LD A,65
CALL TXT_OUTPUT
RET
```

Assembler

```
10 MEMORY &7FFF
20 a=&8000
30 READ b
40 IF b=-1 THEN 80
50 POKE a,b
60 a=a+1
70 GOTO 30
80 END
90 '
100 ' Now type CALL &8000 to
110 ' run the machine code.
120 '
130 DATA &3e,&41,&cd,&5a,&bb,&c9
140 DATA -1
```

Basic poker

Listing I

Have a look at Figure I. It's a picture of the Amstrad CPC's memory map. The main sections are the screen memory right at the top, and the memory pool in the middle. Sandwiched between these is some technical stuff and the jumpblock.

The jumpblock starts at about #BB00 and goes on till about #BE00, with another little section just below this at around #B900. These blocks of memory contain nothing but instructions to jump to various places in memory. When we CALL #BB5A in machine code, the instructions at address #BB5A re-route the computer to another routine buried deep in memory somewhere. This

particular routine displays Ascii characters for us.

The beauty of the system is that it always works – if Amstrad changes the internal workings of the computer, as long as the Jumpblock stays in the same place, all the programs written before the change will still run after the change. That is why most CPC464 programs will run on 664s and 6128s.

Another important point about the jumpblock system is that it is in ram. This means you can change – or patch – bits of it to point at your routines instead of the built-in ones. But I diverge...

If you glance through the Firmware Guide you will see lots of calls to do wonderful things like drawing lines or changing pens. In fact, you can do everything that you could from Basic, and more besides. So now nothing can stop you. You can write anything in machine code – you can be popular.

Of course, there are other ways to be popular. There is the classic "I've got lots of money, would you like some?" approach, which can be very

```
HL=ADDRESS OF THE START OF THE STRING
loop
A=CONTENTS OF MEMORY POINTED TO BY HL
IF A=END OF STRING MARKER
  THEN RETURN TO BASIC
CALL PRINT TXT ROUTINE
HL=HL+1
GOTO loop
```

Pseudo-code

```
ORG &8000
.TXT_OUTPUT EQU &BB5A
LD HL,string     ;Point HL at the text
.loop
LD A,(HL)        ;Load a char into A
CP 0             ;Is it the EOTM
RET Z            ;Yes, return to Basic
CALL TXT_OUTPUT  ;No, print it
INC HL           ;Point to next char
JR loop          ;Round the loop again
.string
DB "HELLO TO YOU FROM THE DEPTHS OF MA
CHINE CODE!",0
```

Assembler

```
10 MEMORY &7FFF
20 a=&8000
30 READ b
40 IF b=-1 THEN 80
50 POKE a,b
60 a=a+1
70 GOTO 30
80 END
90 '
110 ' Now type CALL &8000 to
120 ' run the machine code.
130 '
140 DATA &21,&0d,&80,&7e,&fe,&00,&c8,&
    cd,&5a,&bb,&23
150 DATA &18,&f6,&48,&45,&4c,&4c,&4f,&
    20,&54,&4f,&20
160 DATA &59,&4f,&55,&20,&41,&4c,&4c,&
    21,&00
170 DATA -1
```

Basic poker

Listing II

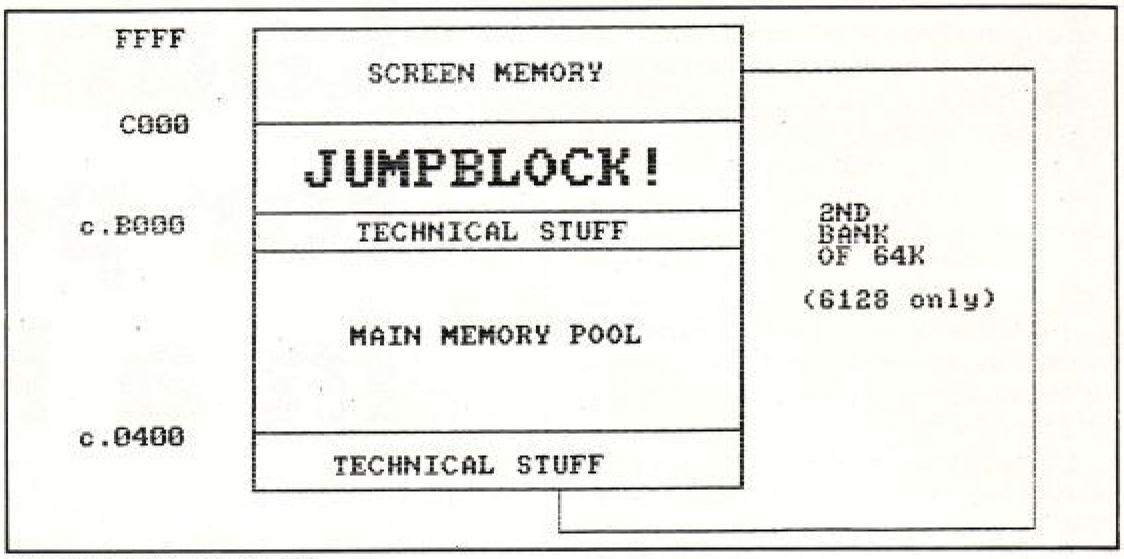


Figure I: The CPC's memory map

effective, especially if you do happen to have lots of money. Also guaranteed to get you talked about is the wonderful Exploding Cooker Trick.

Simply sneak into the kitchen and when no one is looking put all the tins of catfood you can find into the oven and switch it on to full power. Then retire gracefully to the safety of the living room, happy in the knowledge that within 30 minutes everyone will want to know where you are. (NOTE: this can be dangerous – meaty chunks travelling at 90 miles per hour can seriously damage your decor).

Undoubtedly the most effective way to look Really Cool and make lots of friends is to take up juggling, but I have neither the time nor the energy to explain how to start doing that here. Another time, maybe...

Beyond the letter A

Anyway, let's put our letter printing routine to good use by writing a short program that will print a string on the screen. (A string is simply a collection of Ascii characters that usually represent words). Look at the pseudo-code program in Listing II. (For those of you STILL without an assembler, the Basic program will achieve the same result).

Now that looks easy enough, doesn't it? The end of text marker (EOTM) is just a nule character that we have defined to say "OK, there is no more stuff to print". Notice that it is never printed because it is checked for before the call to the print routine.

It's at this point that I think I should mention the concept of modular programming. You can see that the string printing routine is a complete little program in itself – to get it to print different strings you just load HL with the suitable address and then call the string printing routine.

It's worth putting a title on this routine – just a name and something to tell you what it does – and saving it away on tape or disc for future use. Then, whenever you are writing a program in machine code and you suddenly need a routine to print a string, you'll have one all ready and waiting.

If you build up a library of these modules of code, you will find that writing programs becomes a lot faster since you won't have to re-invent the wheel every time. Also, because each module has a little story saying what it does, your programs will be much easier to understand.

There, don't say I never tell you anything interesting.

If you want the string printing routine to do something really exciting, you can try printing non-Ascii characters with it. A quick glance towards the rear of your User Guide will reveal a table called "Basic control characters". Funnily enough, that's exactly what these characters do – control things. Who said computer programmers have limited imaginations?

Let's start with a simple one – character 7 – which is given the TLA (Three Letter Abbreviation) of BEL. Every time you print the BEL character, the computer will make that hideous little bleep that gets right up your nose. So, to change the program to print "URGH!" and then go beep! we just replace the final statement to be:

```
DB "URGH!",7,0
```

and that will do the trick. Try it if you don't believe me.

Using these control characters you can affect the way your text is printed. What do you think the following will do when printed?

```
DB 24
DB "Shumething different shurely?"
DB 24,0
```

Looking at the control codes, 24 will swap the pen and paper inks and so print the text in "inverse". Remember that we still need the end of text marker.

A slightly more useful code is 31 which will place the cursor for us. In other words, it sets where the next piece of text is to be printed. Combining this with the code to clear the screen (12), the following will perform a CLS and then print the word "Hello" halfway down the screen and 2 spaces to the right.

```
DB 12           ;cls
DB 31,2,12      ;locate 2,12
DB "Hello!",0 ;the text and EOTM
```

Isn't it amazing what you can do with only one firmware call? Just think what you will be able to do when we look at the remaining two hundred and twenty...



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FRIENDLY COMPOSER

Alex Davidson staves off anorexia while using a noteworthy program

THERE are two methods of making music on the CPC, either by manipulating the machine's sound chip or via Midi. By using the Midi system you can control various synthesisers and other musical instruments, though the hardware and software required tends to run into hundreds of pounds. The alternative is to access the humble AY3-8912, the CPC's sound chip.

Several packages, like Rainbird's Advanced Music System and Gremlin's EMU, try to make the most of this noise generator. Another, the Micro-Music Creator from First Byte, has recently been released. But is there really any place or need for it among all the other titles that abound?

MMC enables you to create music on a conventional stave and replay the compositions from your own programs. You can also capture real, everyday sounds – like a dog barking, your voice or music – and have the computer play them back. This is known as sound digitising. Captured sounds can also be included in your own software. Neither the Advanced Music System (£29.95 on disc only) nor EMU (£14.95 on cassette and £19.95 on disc) have this digitising facility.

From the main menu, which plays a tune and occasionally screams, you can elect to enter the Composer, Digitiser, listen to a demo, run the freebie game or view a help file.

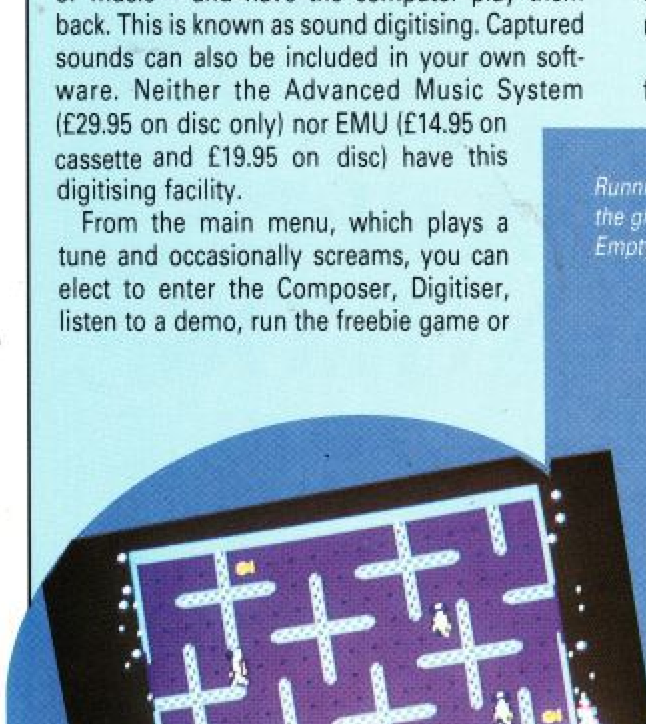
The Composer is the place to go if it's music you want to create. It consists of the standard bass and treble staves on which notes can be planted. Any of six note types (demisemiquaver to semibreve) can be positioned anywhere on either stave.

The CPC has three voice or sound channels. This means three notes can be played simultaneously. Unlike The Music System, which has different staves for each channel, MMC has only one for all three. There is room for around 500 notes per channel.

After being planted notes can be inverted (which causes the tail or stalk to point to the ground), tied, converted to rests or dotted (which extends a note by half its normal value). Accidentals (flat, sharp, natural and so on) can also be added. A note's pitch can be increased or decreased easily without having to delete the old note first. The same is true for a note's duration.

Bar lines aren't inserted automatically, which is fine if you know where they are supposed to go, but not too helpful for the novice musician – still, the resultant sound is the same wherever the bar lines are.

Running from the ghosts in Empty Tummy



Certain options can only be altered from pull-down menus. One of the most important is the status window. This lets you alter the tempo (from a galloping rapido to a very relaxed lento), octave, key signature, repeat (determines whether a tune plays ad infinitum or not) and the current channel setting.

When a note is entered on to a stave the current voice is assigned to that note. A voice window allows you to change the voice or sound a particular note makes.

There are 15 pre-defined sounds, from piano to bass drum, and if you're not happy with the selection you can edit them from the envelope designer. The envelope designer works in exactly the same way as do the Basic commands for defining tone and volume envelopes.

From the envelope designer you can view a sound's waveform at several different magnifications, alter the initial amplitude, add white noise (to create drum, cymbal and explosion effects), determine the number of sections to a wave and modify any part of a wave. Either tone or volume envelopes can be manipulated. Envelope voices can be loaded or saved at any time in groups of 15 voices.



Other functions can also be performed. For instance, changing pen and paper colours, erasing a file (disc version only) or cataloguing.

Once you have finished a composition you can save it in a compressed format. This binary file keeps track of voices used, whether a tune repeats or not, and so on. It is this file that you can use in your own programs.

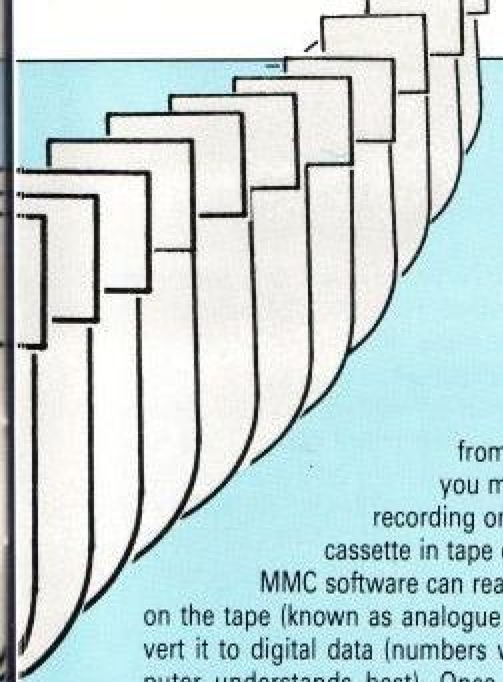
Capturing sounds

The music file introduces an RSX (bar) command to the system which, when entered, starts the music playing under interrupt. The computer, meanwhile, can get on with other tasks like processing your program.

Composing music is gratifyingly simple. You don't need to understand musical notation to produce good tunes.

Even using the music data in your own programs is hassle-free – there are no obscure peeks or pokes to remember which is where many programns fall down.

For the CPC to grab your voice, or the latest



from Was Not Was, you must first have a recording on cassette. With cassette in tape deck, the clever MMC software can read the data held on the tape (known as analogue data) and convert it to digital data (numbers which the computer understands best). Once the data is in memory the computer can chop and change it, send it to the sound chip and perform all manner of operations.

So much for the theory, but what is it like in practise?

Surprisingly simple. You won't be aware of what the computer is doing; one moment the music is on cassette, the next minute your CPC is doing Radio 1 impressions. Quite extraordinary, especially if you haven't come in contact with such a product before.

The Digitiser (which is where the action occurs) consists of two columns of options, an area dedicated to displaying a graphical representation of captured sounds and a prompt window. Control is very slick. Simply by using the cursor cluster or a joystick you can scroll through the choices until the required one is reached. A tap on either the spacebar or fire button selects the option.

Most features on the left column of options are dedicated to file management – loading, saving, cataloguing, and so on. The disc version of MMC includes facilities for erasing and renaming files, selecting a drive and even formatting a disc. Cassette owners can change the baud rate (the speed at which data is saved). Other handy options include definable background and foreground colours.

A horizontal line with two vertical bars at each end represents the upper and lower limit of memory space for digitised data. The bars can be moved anywhere on the line. Any options that are chosen will affect the memory between the two bars or pointers.

When sounds are read into the computer a graph of the data is printed between the two pointers. The speed at which sound is recorded or replayed is alterable.

Once a sound is in memory parts of it may be cut, copied, pasted or reversed. Great effects can be produced in no time. MMC comes with a 30k file of digitized data – impressive. The sounds produced aren't crystal clear (a limitation of the CPC and not the software), but still understandable.

Incorporating digitized data into your own Basic or machine code programs is very simple. It is done using a similar method to the music data created with the Composer.

Conclusion

With Micro-Music Creator you get a free game, Empty Tummy. It is a variant on the Pacman theme. Even so, it's better than a lot of budget titles currently doing the rounds. Its real purpose is to demonstrate what can be done with MMC – it contains an interesting sound track and plenty of digitised effects.

Micro-Music Creator works well and is simple to operate. It may not have everything a professional musician might want, but as a utility it does everything it claims it can. Excellent results can be created with little effort.

Although it doesn't look as pretty as The Music System, and hasn't got separate staves for each channel or a printout facility, it is friendly, packed with options for producing music and digitised effects, allows you to replay your creations from your own Basic or machine code programs, has a decent free game and is wonderfully priced

First Byte Software, PO Box 50, Yeovil, Somerset, BA20 1XS. Tel 0935 851265. £24.95 rom, £14.95 disc, £9.95 tape.

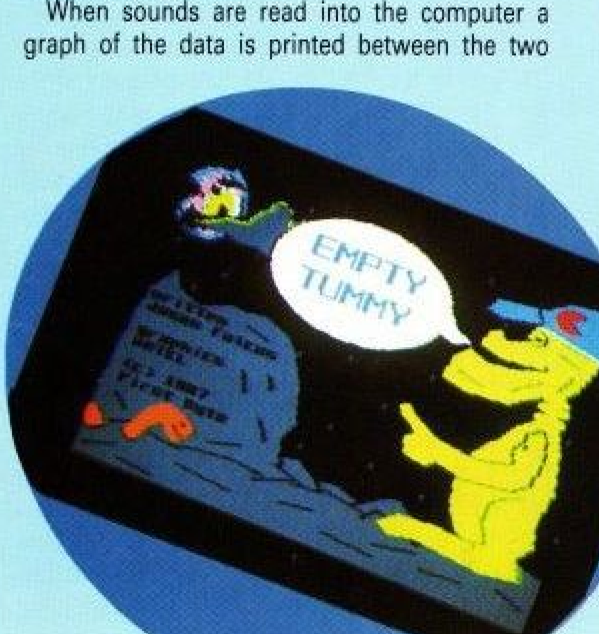


Five way choice

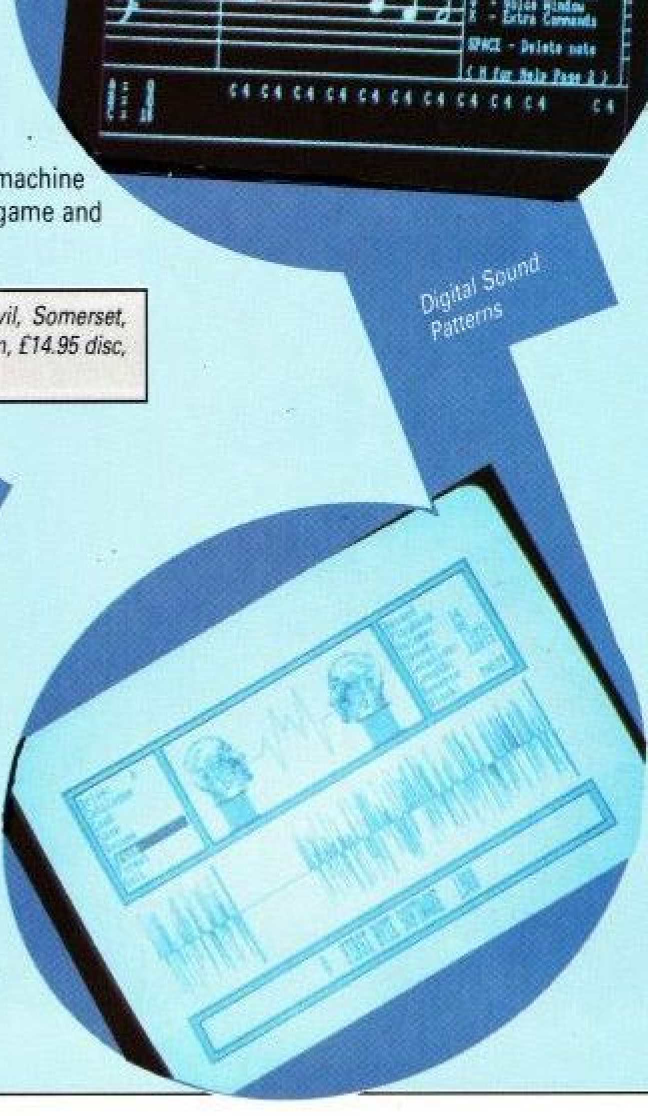


2 staves, 4 octaves

Chasing the ghosts from the Empty Tummy



The free game



Digital Sound Patterns

ROBICO Software has a number of successful adventures for the BBC computer but only marketed one previous adventure for the Amstrad CPC, Rick Hanson. This was a reasonable game, with good puzzles, but has rather repetitive location descriptions.

However, Robico's second offering is something quite special. Like Rick Hanson, the Village of Lost Souls is text only, but there is plenty of it and there are more than 200 locations to explore. There also seems to be an enormous number of objects to find and potentially manipulate.

The action takes place in the medieval setting of Albion, a world where magic is still widely used. Only those gifted with the Talent may call on these powers and its use is strictly controlled by the Order of Saint Leofric.

To ensure that magic is only used for the good of mankind, each Talent is regularly examined by a member of the Order's Inquisition. The underlying fear being that contact with the arcane might corrupt the user in mind, body and soul.

Saint Leofric, the discoverer of the Thirteen Realms of the Arcane, found that twelve of them were moderately safe but that the thirteenth was a realm of disorder, a true Realm of Chaos.

You play the part of Nathan, Inquisitor of The Order of St. Leofric. You have been sent by the ruling Council of Twelve to investigate reports that the Lord Talent of the village of Dinham has been attempting to open a portal into the forbidden Thirteenth Realm.

You must help the Rector of Dinham destroy any window that has been opened to that dreaded realm.

Transported by magic (what other way is there to travel?) to a ring of giant standing stones just outside the village, you begin to explore.

Roofs are torn off, homes deserted, strange claw marks everywhere, animals torn and humans lying dead, even a child's doll used as a macabre pin cushion. All that meets your gaze seems to be tainted with a great evil.

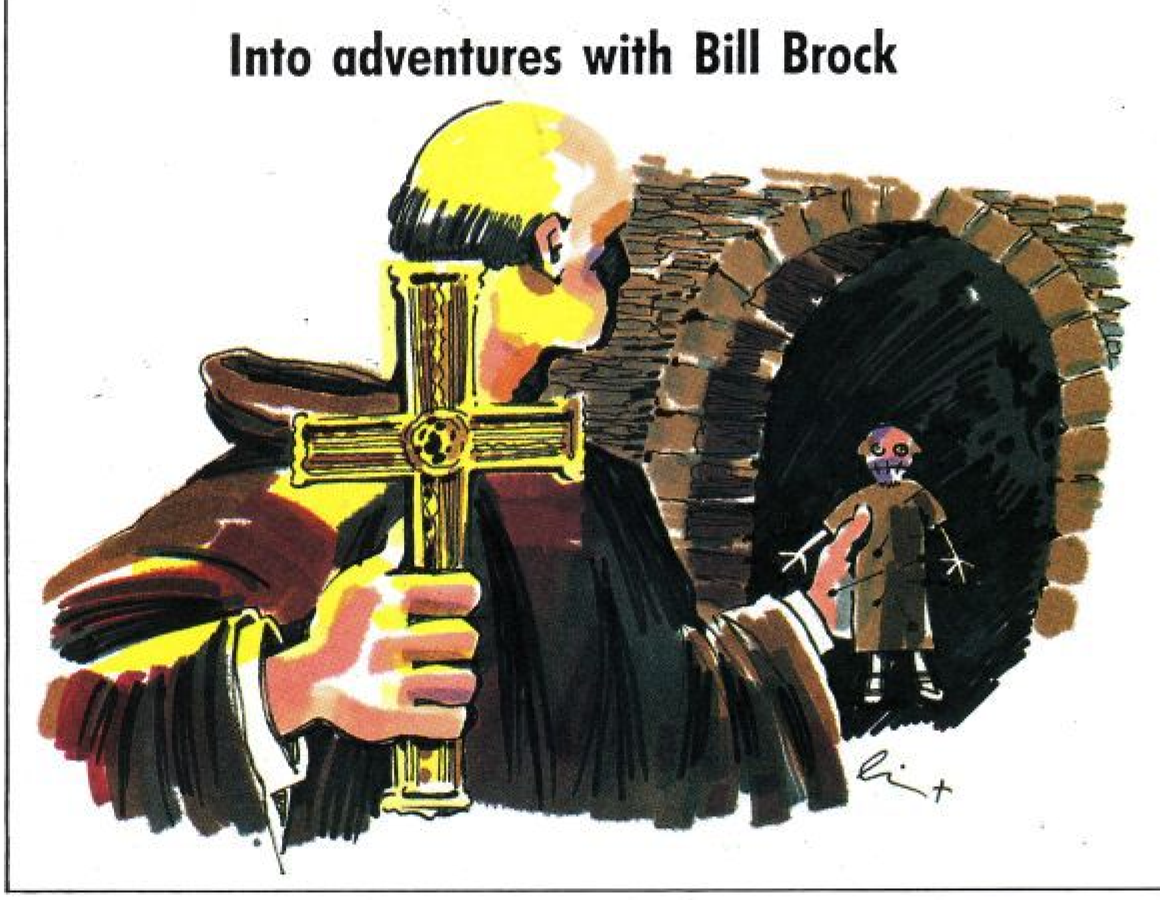
Birds steal your possessions and roving bands of dogs run off with things that you are sure would have been useful. If only you could have picked them up in time! Almost everywhere in the village is the smell of smoke; surely somehow you could put out the flames, and save someone from being burnt alive.

If all this seems to be a complex problem to solve – you have only just touched the start of it. Village of Lost Souls will give you plenty to get your teeth into. Plan ahead and allow plenty of time to get to grips with this one.

A great many locations are accessible right from the start, with nothing to impede your progress other than the programmer's rather warped directional sense. Yes, this adventure suffers from my one pet hates, totally illogical spatial organisation.

Seek and ye shall find

Into adventures with Bill Brock



Map mayhem

THIS becomes apparent within a few moves, when you travel north from a mill to a cottage. To return to the mill you must go west. This is confusion for confusion's sake, and detracts from the real purpose of the adventure.

If this was all, it would not be so bad, as it only means a few extra lines drawn on the map. Unfortunately the village also has another snag that will catch the unwary. Many locations are reached by going IN to a building, on several occasions the interior takes up much more space than you have between already-mapped areas on your carefully drawn map.

This business of needing to insert two (or more) places where you only have space for one, is not restricted to indoor locations. This sort of problem can be partially solved by drawing separate little maps for each special area. Of course you will not know in advance whether a location needs such treatment. This can lead to unnecessary frustration – programmers please note.

Mapping in these circumstances is very important, even more so in this case because of the large number of items that may be of use later.

If you do not already do so, it is worth keeping a separate list of all you find. You may very well see a pattern linking some of them that will suggest a future course of action.

There is plenty of text to read, and because of this you may find that examining objects mentioned does not get as many useful responses as you would like. Persevere, EXAMINE is a powerful tool in the village.

Village of Lost Souls was written some time ago, but has been re-written incorporating a more modern parser that will accept multiple commands, the use of ALL and BUT, OOPS (or OG – go backwards) and a ram save/load facility.

HELP produces a long list of possible verbs (but not all) and TLONG/TSHORT will give long or short location descriptions. If a command is not

understood the responses are pretty bland, and some fairly obvious, but incorrect, actions are not catered for. This small drawback is amply made up for by the quantity of descriptive text and the challenge the adventure offers.

There is a steady undercurrent of perverse humour, and although it is not an easy game to solve, even a novice adventurer will find plenty to explore and puzzle over.

If you are really stuck, Robico has a hint sheet that will finally end those sleepless nights. Even with the game's sometimes strange sense of direction, Village of Lost Souls is well worth the effort required to puzzle out its innermost secrets.

Trail of horror

CRL started out on a slippery path when it launched Dracula with a blaze of publicity for its 15 certificate. Many would say that the reason was purely to increase publicity rather than a responsible attitude to what should or should not be seen on our screens.

Even assuming the best intentions, very little in the way of 'orrible 'orrors that were a necessary part of the adventure, so it is easy to see why it came under fire.

CRL has added two more 15 rated games to its lists, Frankenstein and Wolfman. Hopefully we will look at Wolfman next month. All I can say at the moment is that I hope it is more friendly than Frankenstein.

Written by Rod Pike and with a scattering of the now expected digitised pictures, Frankenstein is a poorer product than Dracula, and in my opinion not up to the usual CRL standards.

It is a three part adventure with the first two parts featuring the hunt for and destruction of the monster. The third part puts you in the monster's shoes where you learn what turned him into the killer he has become.

The aim of this section is to increase the monster's IQ so that he can begin to understand what is going on around him and what will help him to survive.



In the first two parts you play Dr Frankenstein. It is four years after his creation of the spare part monster and the doctor's sister has been one of the victims of this horrific being.

In his grief, he swears vengeance and is determined to rid the world of the creature he brought to life. The parser is fairly limited, multiple commands are understood but there is no ramsave/load, oops or all/everything. The vocabulary does not appear to be very large and communicating with the program can sometimes be frustrating.

Text presentation is poor with a lack of spaces between some words and additional full stops



inserted on some occasions. Within the first few scenes a picture seen on the chimney could be taken and yet was still visible if the chimney was examined.

Other examples of the program's inconsistency can be found fairly easily and although this does not necessarily mean that the adventure itself is poor, it is certainly evidence of sloppy programming that may well affect the player's confidence in the game.

The plot

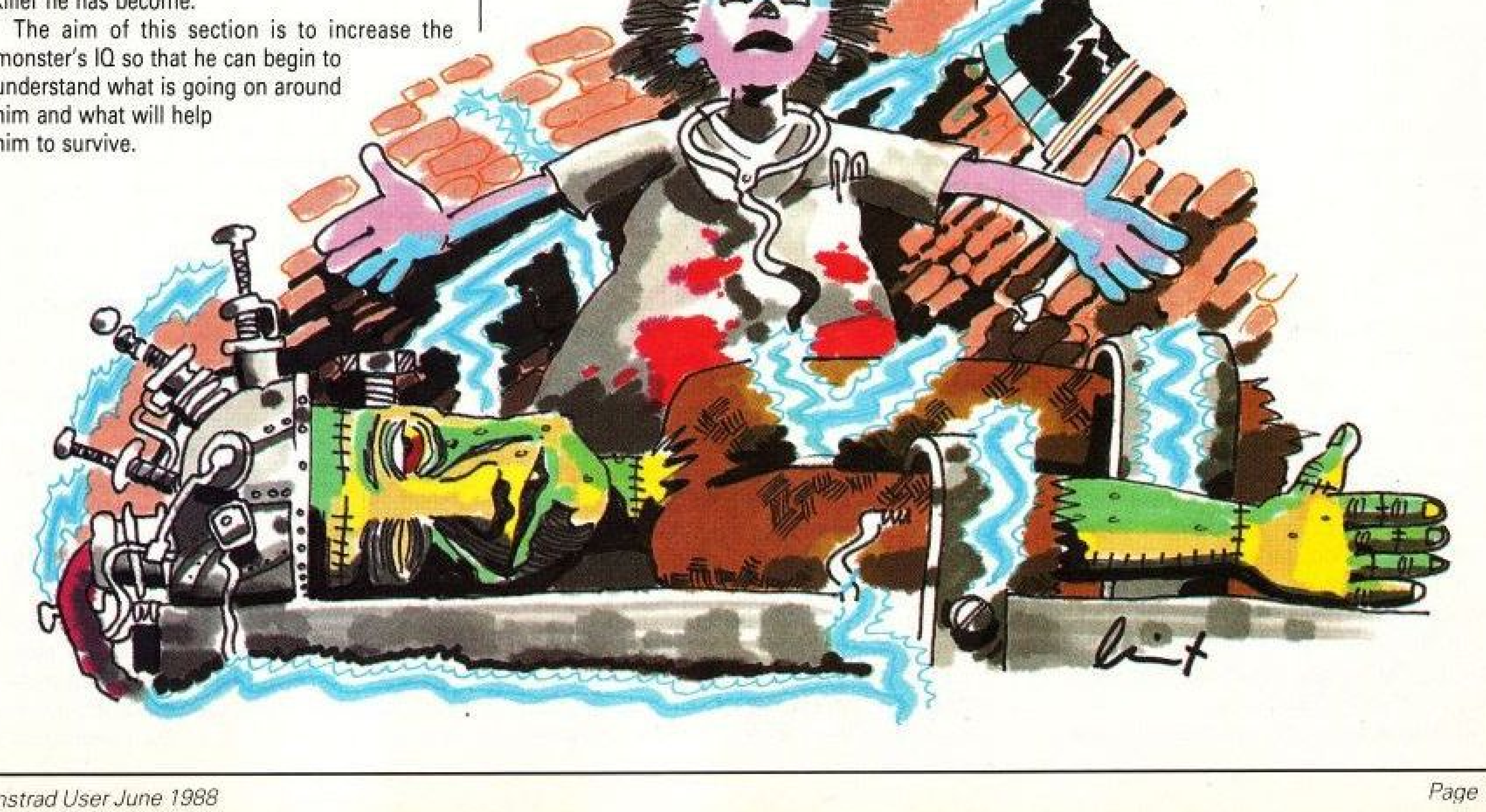
YOU start in your (the doctor's) bedroom in your parent's house up in the mountains. A storm is raging and unless you move very quickly the game will end there. It is impossible to leave the house before your father arrives, and this will not happen until you have sat down and waited. Once you have left the house make sure that you have money, the picture and the knife. You will need these to map the mountain path maze, which is the next puzzle.

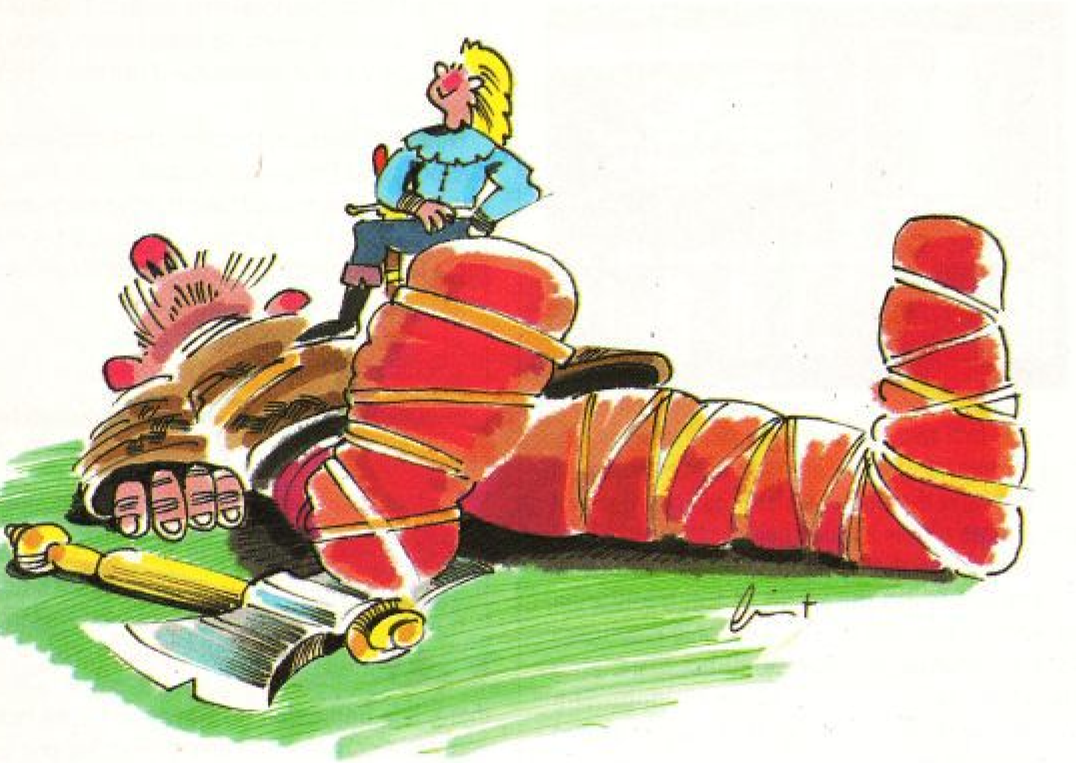
The instructions (very brief) will tell you that you may LOOK, LOOK AROUND, SEARCH, EXPLORE as well as our old friend, EXAMINE. Some of these may appear to be synonyms for each other – not so, LOOK AROUND and LOOK may well give you a different insight to your surroundings.

Also, if you have to jump anywhere, ensure you specify where you want to jump to.

Having reached the village at the foot of the mountains, you must travel across the lake to reach the range of mountains where the creature has been sighted.

Now into the second part, where you will come





across people to whom you can talk. Choose your questions with care, only a very limited number are understood.

Having outfitted yourself for the gruesome task ahead, you can at last take direct action to achieve your aims. Part three is clever in concept, but suffers from some of the poor programming found before. The idea of using all your senses to increase perception and understanding are well thought out.

Although the adventure is not that difficult, I would not recommend it for the novice. The path you tread is fairly well defined from puzzle to puzzle, but there is not much to see or do if you are unable to solve that section.

Not for the fainthearted

I LOOKED last month at a couple of adventures from Topologika that have a medium difficulty rating. This month it's Acheton, with a rating of "a real challenge". This was first seen on the BBC Micro and is a first rate derivative of the original Colossal Cave adventure.

Acheton is only available on disc (CPC and PCW) and is text only. The aim is to solve devious puzzles and collect as much treasure as possible, the plot, as such, not having any real bearing on how you play.

The style is dated, with scrolling text and a limited parser that will not accept multiple commands, no ram save/load and like other games from Topologika – no EXAMINE.

The parser appears to reject an input if it does not understand EVERY word typed in (many modern parsers look for what they CAN understand). A few attempted commands will mean that the location description has scrolled off the top of the screen. You then have to LOOk (no short form L) to see where you are and what you have in the way of listed exits.

Mapping is important, and certainly in one or two places you will not get back to where you started by going NE, S, W. Acheton is a big game and will keep you occupied for a considerable time.

As with the Topologika games mentioned last month, there is an excellent system of helpful hints on tap. In a printed list you look up the item, place or character that is giving you trouble. Via a further question, this will give you a number to type in to the computer and up comes a hint. If this is not enough, you may be offered others.

The bulk of the action takes place undergound – and to get there you will have to climb a tree! Everything you find will either be useful, a treasure or both. Try not to waste time playing games, and study the habitats of strange creatures.

It is surprising how quickly we have all become used to the improved parsers and facilities of even run of the mill adventures produced today. Acheton is a little dated, but give it an hour or so for you to become accustomed to its lack of modern conveniences and it will keep you happily busy for days.

With a difference

IF you fancy an adventure with a different approach altogether, you might consider Topologika's Giant Killer. It makes a good adventure game primer, but its real purpose is to give you a feast of mathematics in an entirely digestible form.

The adventurer wears the mantle of Jack (or Jackie) in the age-old story of Jack and the Beanstalk. Jack is given a groat by his Mum and sent to the market to buy a pig. All the pigs have been sold, so Jack has the option of going home without one or trying to make his groat turn into something more worthwhile.

With a bit of luck and some elementary maths, the groat may be turned into a penny, then a guinea and finally a magic bean. After this you must explore everywhere and find all the other treasures. Each is associated with some mathematical puzzle.

The game was originally aimed at 10 to 14-year-olds, but a growing number of adults have found the challenge just as fascinating.

The program has proved an admirable vehicle in schools for teaching problem solving.

Topics covered in the early stages include simple calculations, an understanding of spatial relationships (mazes) and co-ordinates. Later on more complex problems are encountered.

The 24 page booklet with the game introduces the idea of adventuring and also has some notes for teachers and parents. There are notes covering what is intended to be learnt from the puzzles and how to solve them – but not necessarily the answers!

Regardless of your age and adventuring skill, you will certainly learn something from Giant Killer, if only that your observation and common sense were not quite so well honed as you thought.

I suspect that some of the younger members of the family may well score better marks than those ancients that left school all of five (or more) years ago.

Thoroughly recommended (even if it does not understand the word EXAMINE).

At last!

I DO not normally talk about adventures that are not generally released or that I have not seen working on *my* Amstrad. Not only is it too easy to be taken in by pre-production offerings, but I think it is a little unfair, and possibly misleading, to be talking about a game that is currently available only on another computer.

Also how can ratings honestly be given for a game that does not exist? Software houses certainly try to make all versions the same, but there are usually some differences to be found, if only in the graphics.

With the lead time required in the production of a magazine, it can be very tempting to be the first to tell your readers of the latest adventure, hoping (and often believing) that the program will be out by the time that the article is read.

For once, I just cannot keep bottled up... One of my favourite types of adventure is that which closely follows the patterns of games such as Dungeons and Dragons (a TSR role playing game).

Until two weeks ago, the only game of this type that I knew of for the Amstrad was Mandragore by Infogrames. The ideas were good but its implementation was pale compared with other games of the same type on Commodores and Ataris.

Soon, very soon, probably by the time you read this, Electronic Arts will be releasing The Bard's Tale for the CPC.

Get out those rusty swords and give them a good burnish. Do some extra press-ups each morning and run round the park one extra time – you'll need everything in your favour to survive.

I have played the Tale on the Commodore

Amiga and on the Amstrad PC and am totally hooked. If any criticism can be made, it would be that the ratio of fighting monsters to solving quests and puzzles is somewhat too great. The graphics are good and I find the combat believable.

With your companions, stride out of the Adventurer's Guild into the town of Skara Brae and be ready to fight for your lives.

Explore and map the sewers, catacombs, castle and the tower, learn the dark and deadly secrets they hold. Find all sorts of special weapons, armour and magical objects, then when you think you are finally ready; challenge the power of the evil lord of Skara Brae.

With luck, next month I will be able to tell you what the Amstrad CPC version is like. There has not been a bad conversion yet, so lets hope ours is as good as the others. Watch this space.



RATINGS

	Village of Lost Souls	Frankenstein	Acheton	Giant Killer
Plot	67	60	55	56
Atmosphere	67	60	62	60
Addiction	72	58	72	68
Difficulty	70	65	70	58
Overall	68	59	63	62

Putting on the face

Pat Winstanley concludes her adventure trilogy



IN this last part of the series we'll be looking at ways to improve the appearance and playability of our game, but before going any further, who spotted the deliberate (?) error in the listing so far? A stray RETURN command missed from line 1810 generates an extra, unwanted message when dropping objects so, amend it as follows:

```
1810 IF objloc(noun)=-1 THEN PRINT "Ok
     ay... dropped":objloc(noun)=room:
     RETURN ELSE PRINT "I haven't got
     that."
```

Those of you with tape based systems will be well aware of the time taken saving and loading your programs during play, and even disc users welcome the extra speed of a ramsave/load, so that's the next thing to implement.

Saving to ram uses the same principles as saving to disc or tape which we've already tackled – getting the values of the variables we want to save then copying them to somewhere else. The "somewhere else" in this case is a small portion of ram which the program will not use for anything else.

In order to cordon off an area of ram we first decide how much space is needed, then use a MEMORY command to lower HIMEM. Around 100 bytes is sufficient for our purposes, so we want to lower HIMEM by about this much. You can find out where HIMEM is by resetting your machine then typing as a direct command:

```
PRINT HIMEM
```

On my 6128 this gives a figure of 42619 so, in Listing I, I've chosen 42500 as an easy number to remember, and which leaves about 100 bytes free. This memory is only reserved once, so the command is part of the initialisation routine (line 63). From that point onwards your program won't be able to overwrite that section of memory.

The simplest way of writing to an area of ram is by using the infamous POKE command beloved of arcade game hackers. What POKE does is insert a number into a particular memory address. And here we hit a snag. Only positive numbers may be POKEd into memory, and we want to store the location of all our objects, some of which might be at location –1 or –2 if they are being carried or worn.

Because we can't POKE these values directly, we will have to convert them to positive numbers first, then convert them back again during ramload. For each negative value found in the main loop we simply add 100 to it before POKEing the new value into memory. When we come to ramload the procedure is reversed, 100 being subtracted from the PEEKed value before it is written back to the array.

We also need to save the other game variables in the same way as a normal save, each value being POKEd into the next address. As with the normal save and load routines, it is vital that values are read back in the same order as they were written.

Another common command in adventures these days is oops which takes the player back a turn if he has killed himself or done something else equally silly. Implementing oops is simple enough in Basic, being a modified ramsave/load routine.

All we need to do is reserve enough memory for a second ramsave position and repeat the ramsave routine at a different set of memory addresses. Then a line should be inserted which will be checked after the player's input has been parsed but before any other action is taken.

This line checks to see if "oops" has been typed, and, if so, a ramload automatically takes place from the "oops" section of the ramsave area, and control is passed to line 590 again for a new command from the player. If the player has not typed "oops" then a new ramsave is made to that area. In this way, the state of play immediately before the last command is always available to rub out silly moves.

```
65 MEMORY 42500
3600 REM ::::::: verb RAMSAVE :::::::
3610 tempm=42500
3620 FOR x=1 TO numberofobjects
3630 IF objloc(x)=-1 THEN tempv=99:GOT
     O 3640
3631 IF objloc(x)=-2 THEN tempv=98:GOT
     O 3640
3635 tempv=objloc(x)
3640 POKE tempm,tempv:tempm=tempm+1:NE
     XT
3699 RETURN
3700 REM ::::::: verb RAMLOAD :::::::
3710 tempm=42500
3720 FOR x=1 TO numberofobjects:tempv=
     PEEK(tempm)
3730 IF tempv=99 THEN tempv=-1:GOTO 37
     50
3740 IF tempv=98 THEN tempv=-2:GOTO 37
     50
3750 objloc(x)=tempv:tempm=tempm+1:NEX
     T
3799 RETURN
23080 DATA "N","S","E","W","U","D","CL
     IM","DROP","EAT","EXAM","GET","G
     IVE","I","INSE","JUMP","KNOC","L
     ","LOAD","QUIT","REMO","RIDE","S
     AVE","THRO","TIE","WEAR","RAMS",
     "RAML"
```

Listing I

Screen layout

At the moment our game looks very raw on screen. Text formatting is a matter of working through all the text strings and inserting spaces to make words wrap around correctly on to the next line instead of being split in the middle.

Before doing this you'll have to decide in what

mode the game will be played. It is possible to write routines to format the text automatically, but that is beyond the scope of this article. For now you'll have to do it by hand.

However, it is very easy to pretty up the general appearance of the screen by using windows (not in Mallard – sorry!) and Listing II is a short routine to split the screen into two windows. The upper window is used to display the room description,

```
30000 REM ******* WINDOWS **********
30010 WINDOW #1,3,38,3,7
30020 WINDOW #0,3,38,10,23
30030 PLOT 1,1:DRAW 1,390:DRAW 630,390
 :DRAW 630,1:DRAW 1,1:PLOT 1,272:
 DRAW 630,272
30100 RETURN
```

Listing II

and changes only when a move is made or the player types "look". The lower window displays all the other information about the gameplay.

Line 30030 simply draws a few lines to frame the windows. The effect is rather stark at the moment, so try embellishing it using drawing commands and (if you have a colour screen) defining different pen and paper colours for the two windows and the border and frame.

Having defined some windows we need to direct the computer to print text in the correct place. Listing III shows the amendments needed to our game to ensure this.

In your own games you may find that the windows aren't big enough to cope with the amount of text to be printed. There are a couple of ways of dealing with this. The most obvious one is to change to Mode 2 which will allow more characters to be printed on a line, but has the drawback of still using the same vertical distance for each line.

Another way is to adjust the relative size of the windows, or perhaps define another window vertically down the right hand side of the screen where objects available and carried/worn can be shown permanently.

In the end, screen display depends purely on personal preference. My own favourite is the full-screen-scroll, Mode 2, Infocom style, your's may be different.

```
63 CLS
64 GOSUB 30000
300 CLS #1:PRINT #1, room$(room)
310 PRINT #1, "Exits : ";
320 FOR n=1 TO 6:IF mvtab(room,n)>0 TH
    EN PRINT #1,MID$(d$,((n*6)-5),6);:
    printflag=printflag+1
330 NEXT
340 IF printflag=0 THEN PRINT #1, "The
    re don't seem to be any!" ELSE PRI
    NT #1
350 printflag=0
360 PRINT #1,"You can also see : ";
370 FOR a=1 TO numberofobjects
380 IF objloc(a)=room THEN PRINT #1,ob
    jtxt$(a);" ";:objfound=objfound+1
390 NEXT
400 IF objfound=0 THEN PRINT #1,"Nothi
    ng at all":objfound=0
410 objfound=0
590 PRINT #0,:INPUT "What now ";user$:
    user$=UPPER$(user$)
```

Listing III

The finishing touches

Having reached this stage we have a game which, although short on plot and size, contains virtually every feature of the top commercial games around.

But technical features are worth nothing without a positive, original, believable storyline to match. Most amateur games I see tend to be either technically brilliant and utterly boring or have an absorbing plot and impossibly awkward gameplay.

The secret is to strike the right balance between user friendliness and realism. Both cost memory, so it is up to you, the author, to decide where your priorities lie.

Graphics in adventures are a sore point among many players. Pictures eat up memory which many – myself included – think should be used for extra puzzles and more meaningful messages. On the other hand, a few well thought out pictures can make a tremendous impact.

It's unlikely you'll be able to find space for graphics in a Basic game, but there is a way to compromise. The substitution of your own character set can make an enormous difference to the feel of a game and doesn't take up much memory.

Think of the impact of a futuristic character set in a space game, or a mediaeval set in a swords and sorcery plot. Anything which is sparing of memory yet adds to the atmosphere is to be recommended. Listing IV is a character set which can be loaded before the main game. The last line simply runs the main game. One point to note is that the memory you have allocated for ramsaves will need to be dropped by several hundred bytes if you are using a character set. I found address 39500 to be sufficiently low.

Another way of adding realism is to give pseudo life to the characters the player meets. Guards can be made to patrol a regular beat by inserting lines in the high priority section which move the character objects round a succession of rooms. Thus in our little game we could define an object as "a guard patrol" and have that object appearing regularly at the bank of the moat or in the courtyard. Characters which always stay in the same place can become very boring.

It is also simple to let the player ask characters about things. You will need to check that the player and the character are both present, and set up a group of messages which give information on various things. Thus the player could ask a country yokel where to find something and receive a response like "Oh arr, over t'hill." Having characters in the game responding in this way adds a great deal to atmosphere.

What now?

Although adventures written in Basic are not really commercially viable, as an exercise you will gain a good deal of structured programming experience and hopefully lots of fun, too. And if you have or subsequently buy a commercial adventure writing utility such as Quill, GAC or PAW, you will find that the programming principles discussed in this short series also apply to them.

There is only one thing more enjoyable than playing adventures and that's creating your own.

```
10 REM ******* LOADER ***********
20 SYMBOL AFTER 32
32 SYMBOL 32,0,0,0,0,0,0,0,0
33 SYMBOL 33,&18,&18,&18,&18,&18,0,&18
   ,0
34 SYMBOL 34,&24,&66,&24,0,0,0,0,0
35 SYMBOL 35,0,&24,&7E,&24,&24,&7E,&24
   ,0
36 SYMBOL 36,0,&8,&3E,&28,&3E,&A,&3E,&
   8
37 SYMBOL 37,&60,&96,&94,&68,&36,&69,&
   C9,&6
38 SYMBOL 38,0,&10,&28,&10,&2A,&44,&3A
   ,0
39 SYMBOL 39,0,&C,&18,0,0,0,0,0
40 SYMBOL 40,0,&C,&18,&18,&18,&18,&C,0
41 SYMBOL 41,0,&30,&18,&18,&18,&18,&30
   ,0
42 SYMBOL 42,0,0,&14,&8,&3E,&8,&14,0
43 SYMBOL 43,0,0,&8,&8,&3E,&8,&8,0
44 SYMBOL 44,0,0,0,0,0,&18,&18,&30
45 SYMBOL 45,0,0,0,&7C,&3E,0,0,0
46 SYMBOL 46,0,0,0,0,0,&18,&18,0
47 SYMBOL 47,&1,&3,&6,&C,&18,&30,&60,&
   40
48 SYMBOL 48,0,&7C,&C6,&CA,&D2,&E2,&7C
   ,0
49 SYMBOL 49,0,&18,&38,&8,&8,&1C,&3E,0
50 SYMBOL 50,0,&7E,&83,&3,&7E,&C0,&7F,
   0
51 SYMBOL 51,0,&7E,&C3,&E,&3,&C3,&7E,0
52 SYMBOL 52,0,&4,&1C,&2C,&CC,&FF,&C,0
53 SYMBOL 53,0,&FF,&C0,&FE,&3,&C3,&7E,
   0
54 SYMBOL 54,0,&7E,&C0,&FE,&C3,&C3,&7E
   ,0
55 SYMBOL 55,0,&FF,&3,&6,&C,&18,&18,0
56 SYMBOL 56,0,&7E,&C3,&7E,&C3,&C3,&7E
   ,0
57 SYMBOL 57,0,&7E,&C3,&C3,&7F,&3,&7E,
   0
58 SYMBOL 58,0,0,&18,&18,0,&18,&18,0
59 SYMBOL 59,0,&18,&18,0,0,&18,&18,&30
60 SYMBOL 60,0,0,&4,&8,&10,&8,&4,0
61 SYMBOL 61,0,0,0,&3E,0,&3E,0,0
62 SYMBOL 62,&3C,&66,&42,&6,&C,&8,0,&8
63 SYMBOL 63,&3C,&66,&42,&6,&C,&8,0,&8
64 SYMBOL 64,0,&3C,&4A,&56,&5E,&40,&3C
   ,0
65 SYMBOL 65,&3C,&18,&24,&42,&7E,&42,&
   E7,0
66 SYMBOL 66,&B8,&44,&44,&78,&46,&46,&
   BC,0
67 SYMBOL 67,&3C,&62,&66,&60,&66,&62,&
   3C,0
68 SYMBOL 68,&B8,&44,&46,&46,&46,&44,&
   B8,0
69 SYMBOL 69,&3C,&62,&60,&7C,&60,&62,&
   3C,0
70 SYMBOL 70,&1C,&36,&22,&38,&10,&10,&
   B0,&60
71 SYMBOL 71,&3C,&62,&66,&60,&67,&62,&
   3C,0
```

Listing IV

```
72 SYMBOL 72,&C0,&5C,&66,&46,&46,&44,&E8,0
73 SYMBOL 73,&3C,&18,&8,&8,&8,&18,&3C,0
74 SYMBOL 74,&3E,&8,&44,&C6,&C6,&6C,&38,0
75 SYMBOL 75,&EE,&44,&58,&70,&5C,&46,&E3,0
76 SYMBOL 76,&70,&20,&60,&60,&60,&26,&3E,0
77 SYMBOL 77,&24,&5A,&DB,&DB,&C3,&C3,&66,0
78 SYMBOL 78,&DC,&66,&46,&46,&46,&44,&E8,0
79 SYMBOL 79,&18,&24,&66,&66,&66,&24,&18,0
80 SYMBOL 80,&38,&C4,&46,&46,&64,&58,&C0,0
81 SYMBOL 81,&18,&24,&66,&66,&66,&34,&1C,&3
82 SYMBOL 82,&38,&C4,&46,&44,&78,&4C,&C7,0
83 SYMBOL 83,&3C,&62,&60,&3C,&6,&46,&3C,0
84 SYMBOL 84,&7C,&10,&20,&64,&62,&63,&3E,0
85 SYMBOL 85,&27,&42,&C2,&C2,&C2,&42,&3D,0
86 SYMBOL 86,&24,&42,&C3,&C3,&C3,&66,&3C,0
87 SYMBOL 87,&24,&42,&C3,&DB,&DB,&7E,&24,0
88 SYMBOL 88,&77,&22,&12,&3C,&44,&42,&E7,0
89 SYMBOL 89,&33,&62,&62,&66,&3A,&2,&42,&3C
90 SYMBOL 90,&3F,&42,&C,&1C,&38,&61,&7E,0
91 SYMBOL 91,&C,&10,&10,&10,&10,&10,&C,0
92 SYMBOL 92,0,&2,&4,&8,&10,&20,&40,0
93 SYMBOL 93,&30,&8,&8,&8,&8,&8,&30,0
94 SYMBOL 94,&10,&28,&54,&54,&10,&10,&10,0
95 SYMBOL 95,0,0,0,0,0,0,0,&FF
96 SYMBOL 96,0,&1C,&22,&78,&20,&20,&7E,0
97 SYMBOL 97,0,&3C,&62,&62,&62,&62,&3F,0
98 SYMBOL 98,&40,&5C,&66,&46,&46,&66,&5C,0
99 SYMBOL 99,0,&3C,&62,&60,&62,&62,&3C,0
100 SYMBOL 100,&2,&3A,&66,&62,&62,&66,&3A,0
101 SYMBOL 101,0,&3C,&62,&78,&60,&62,&3C,0
102 SYMBOL 102,&18,&24,&60,&70,&60,&60,&20,0
103 SYMBOL 103,0,&3C,&62,&62,&66,&3A,&42,&3C
104 SYMBOL 104,&40,&5C,&66,&46,&46,&44,&48,0
105 SYMBOL 105,&18,0,&38,&10,&10,&10,&38,0
106 SYMBOL 106,&7C,&10,&8,&C,&4C,&48,&30,0
107 SYMBOL 107,&E0,&44,&48,&78,&4C,&46,&42,0
108 SYMBOL 108,&20,&20,&60,&60,&62,&36,&1C,0
109 SYMBOL 109,0,&36,&6B,&6B,&6B,&6B,&22,0
110 SYMBOL 110,0,&3C,&46,&46,&46,&44,&48,0
111 SYMBOL 111,0,&3C,&46,&46,&46,&46,&3C,0
112 SYMBOL 112,0,&5C,&66,&46,&46,&66,&5C,&40
113 SYMBOL 113,0,&3C,&66,&62,&6A,&66,&3B,0
114 SYMBOL 114,0,&38,&64,&60,&60,&20,&20,0
115 SYMBOL 115,0,&3C,&60,&3C,&6,&46,&3C,0
116 SYMBOL 116,&10,&3C,&10,&30,&32,&32,&1C,0
117 SYMBOL 117,0,&44,&44,&46,&46,&46,&3C,0
118 SYMBOL 118,0,&44,&44,&46,&46,&24,&18,0
119 SYMBOL 119,0,&22,&6B,&6B,&6B,&6B,&36,0
120 SYMBOL 120,0,&77,&22,&2C,&1C,&22,&77,0
121 SYMBOL 121,0,&22,&22,&62,&62,&3E,&42,&3C
122 SYMBOL 122,0,&1E,&22,&4,&8,&12,&3C,0
123 SYMBOL 123,0,&E,&8,&30,&8,&8,&E,0
124 SYMBOL 124,&10,&10,&10,&10,&10,&10,&10,0
125 SYMBOL 125,0,&70,&10,&C,&10,&10,&70,0
126 SYMBOL 126,0,&36,&6C,0,0,0,0,0
200 RUN "game
```



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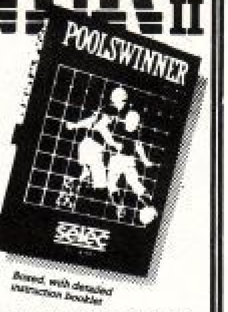
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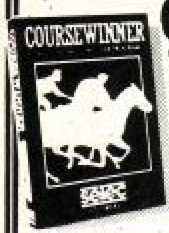
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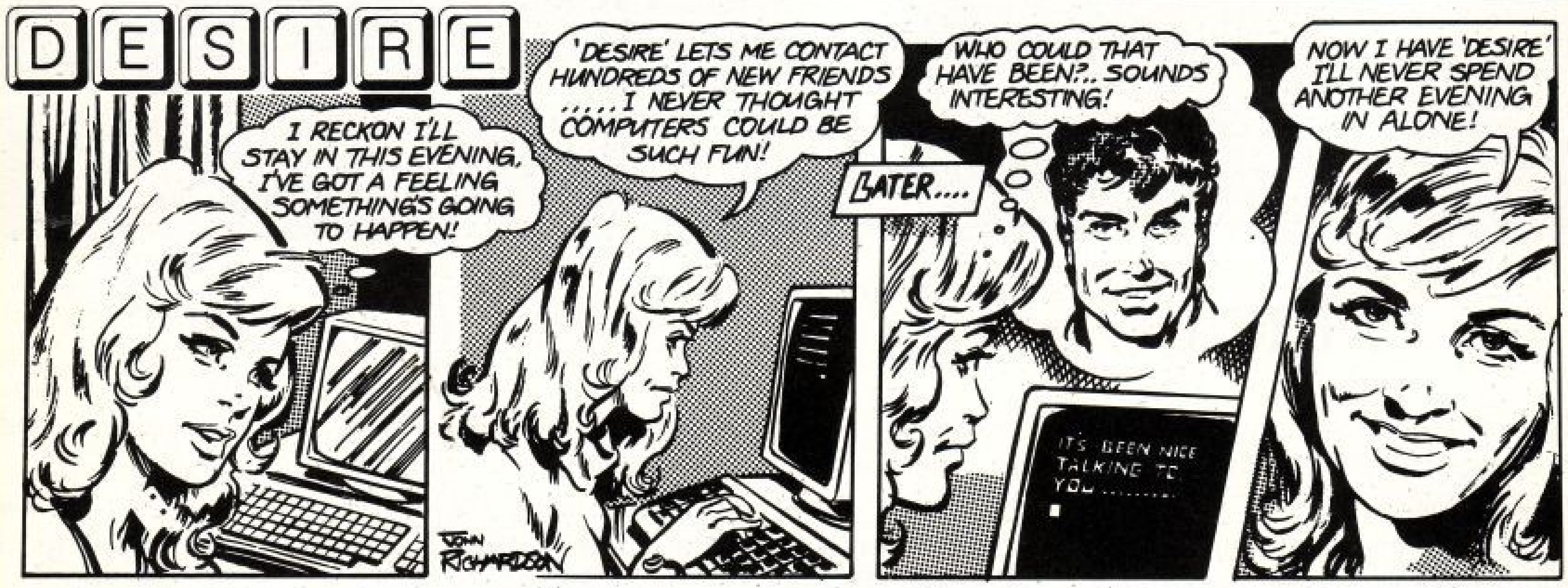
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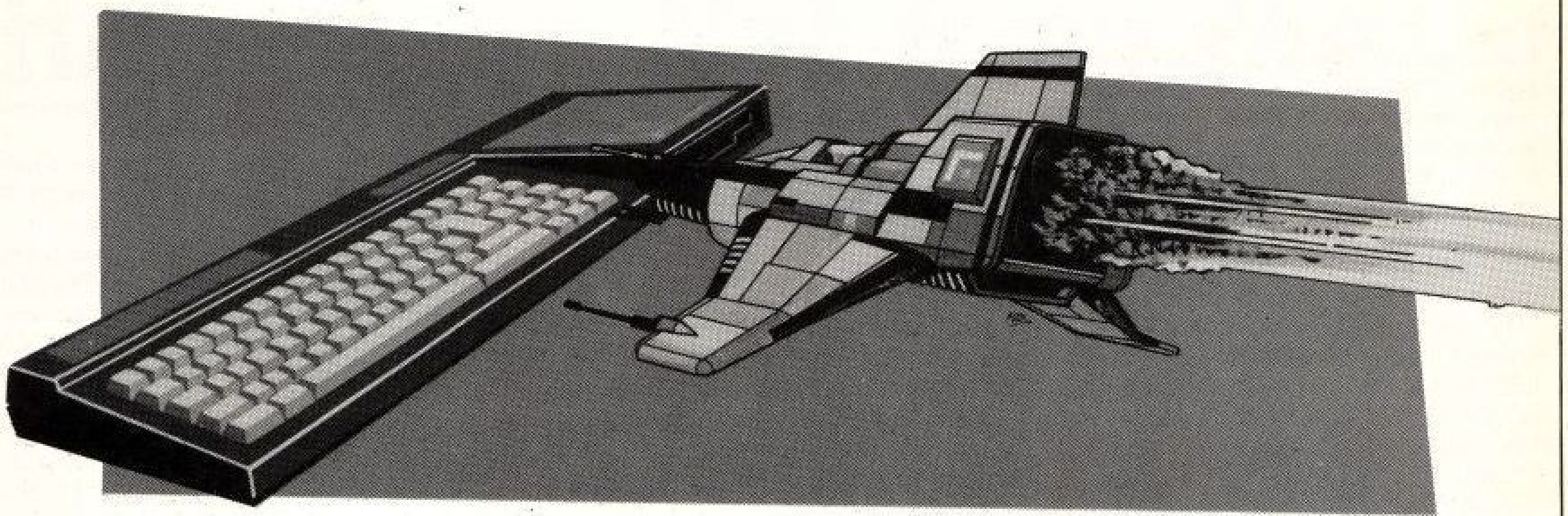
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The CP/M strikes back

Jeff Walker finds out that CP/M+ on rom is all it's blown up to be. But is it legal?

GRADUATE is a new software house which certainly knows how to make an entrance. Its intention, it says, is to concentrate initially on CPC rom based software, and it has kicked off with a biggie, very possibly THE biggie, Digital Research's CP/M Plus.

Now you could be forgiven for thinking that all Graduate has done is transferred the CP/M+ EMS file from disc on to a couple of 16k roms and charged you £24.95 for the privilege. But this is way off the mark.

Not only has a bit of leftover space been filled up with a few Basic RSXs, they've also packed in a number of commands that are either completely new to the CP/M+ system or would normally have to be loaded from disc as transient commands.

The big question, however, is how Digital Research is going to react to this news. Copying software on to rom is very much a legal grey area as far as copyright is concerned, and Graduate has gone one step further by actually altering the program slightly to accommodate new built-in commands. But enough of this solicitor's talk, let's get on with the review.

Easy colour changes

Own up. How many of you know how to use the PALETTE command to change the CP/M+ screen colours? One, two, three ... thought so, not many.

Well, what would you say if I told you that under CP/M+ and without a disc in the drive I can now type INK 0,0 to turn the screen black, BORDER 26 to turn the border white, and INK 1,4 to turn the writing magenta? OK, you'd say I was colour blind or mad or all three, but you get my point.

Then, if the urge rises, I can type MODE 1 or MODE 0 to go into 40 column or 20 column mode, though goodness knows why I should want to, as most CP/M+ programs work best in Mode 2. So I guess it's a good job I can type MODE 2 to get back to 80 column mode.

I can also issue a CLS command – go on, have an educated guess – and a quick INVERSE will invert the inks for me (blue on white, say, instead of white on blue) until I type NORMAL. And if I get really fed up – which, I hastily add, is highly unlikely – I can always send the cursor HOME.

That's the trivia over with. Now we move on to what Graduate has added for the serious CP/M+ user.

There are a number of ways to boot up the Graduate roms. | EMS or | O is the way in, but to save you time both these RSXs will accept a list of CP/M+ commands as a parameter, allowing you to set things up and autorun CP/M+ programs from Basic. For example:

```
|O,"BORDER 0!INK 0 0! CLS! CCP!NSWP"
```

The above changes the border and paper to black (leaving the pen white), clears the screen, and runs a CP/M program from disc called NSWP.

The commands are separated from each other by exclamation marks, and the CCP bit is another command Graduate has added which enables you to restore CP/M+, and the normal CP/M prompt, to how it was before Graduate started playing with it.

CCP stands for Console Command Processor, and is the bit of CP/M+ that you communicate with. The CCP is what Graduate has altered to give us more built-in commands. I have a sneaky suspicion that most CP/M applications won't like what Graduate has done to the CCP, but once you issue a "CCP" command at the keyboard, Graduate's alterations are zapped and you are running exactly the same CP/M+ that you got with your 6128.

No reverse gear

The idea works very well – you do what you want to do with Graduate's extra commands first, and then issue a CCP command before running your program. Unfortunately there is no reverse command, but as it's on rom you just reset your machine and boot it up again. Takes about five seconds.

Another way to boot up the roms is to use | OP. This ingenious little RSX presents you with a menu of all the COM files on the disc in the drive, after which you press a number or a letter to run the program you want.

If the program you want isn't on that disc, press the Escape key and you can try another disc. Press Escape twice and you're back to Basic. This is not the kind of user-friendliness experienced CP/M users are used to. Heavens above! Does this mean someone actually thought about what they were doing?

Some commands that were originally transient

(loaded from disc) have been added to the system so that some commonly issued commands can be executed more quickly. For instance, in the old days to re-configure the keyboard so that the cursor cluster functioned correctly you would have to have used the SETKEYS program from the CP/M master disc, which itself would had to have read a file.

Now, with three commands added by Graduate (NKEY, SKEY and CKEY) you can do it from the keyboard if you like: NKEY 0,31!SKEY 0,31!CKEY 0,31 would set up the up-arrow key, and I won't tell you any more because Graduate shows you how to do the rest in the manual that comes with the roms.

It also shows you how to use the new EXPAND command to assign character strings to keys. Naturally, all these key definitions can be put into a PROFILE.SUB file that, provided it's on a disc in the drive, gets booted automatically when you type | EMS or | O from Basic.

Other former transient commands that are now built into the Graduate roms are AMSDOS, LANGUAGE, PALETTE, SET24X80, and SETLST. The last, used to set up your printer, no longer reads a file from disc to get the control codes, it now accepts parameters. For instance, SETLST,77 would set an Epson printer up for Elite pitch printing, and SETLST,15 would set it up for Condensed.

Of course all the standard built-in commands are there too; DIR, DIRS, ERASE, RENAME, TYPE, and USER all work exactly the same as normal because Graduate hasn't played with them.

Beautiful screens

The 24LINE and 25LINE commands are a nice addition. They switch the bottom line of the screen on and off. (You know, where you get the error messages and the "Drive:A" bit). And there is also a handy little command, WAIT, which puts "Press Return to Continue" on the screen – as Graduate says, very handy for SUBmit files that create beautiful sign-on screens. Typical programmer's addition, that one.

(Talking about sign-on screens, whoever's idea it was to make these roms sign on by plastering red and yellow all over the top half of the screen ought to be made to sit and stare at it for a week).

Tucked into the rear end of one of the roms are some RSXs that have nothing to do with CP/M, the only two worth mentioning being | PASSWORD and | PW. You would use these in a Basic program, probably in conjunction with each other, to give, say, the program that loads your database a modicum of protection.

The roms will work on a 6128 with a rom board that has two spare slots (no, not 0 and 7 – anything but). 464/664 owners will need a disc drive, an extra 64k memory, plus a rom board and the right to CP/M Plus (whatever that means).

Graduate says it believes the roms to be compatible with all CPC peripherals, but they are known to be compatible with the DK'tronics Silicon disc, Arnor roms (someone's been thinking again), the Amstrad FD-1 and the Pace 5.25in second disc drives, plus the Amstrad RS232 interface, software and modem. I can vouch for the first three.

So there you are. If you are into utilities you should be into CP/M+, and if you are into CP/M+ then this upgrade deal is a steal at £24.95. Somehow it has made CP/M+ more a part of the computer than it was before.

CP/M Plus Loader Rom, £24.95 plus your original master disc, Graduate Software, 19 Everest Road, Fishponds, Bristol, BS12 2BX

Hot from the reservation

Swiss pokes and Turkish cheese plants, Vax has it all under control

HI FOLKS! Welcome again to the convoluted world of copy protection analysis. This month the battle between man and word processor takes place in the Computer Reservation. This is a small corner (Hah! Almost half the living room. Suz) of the Hacker's Hovel that is cordoned off from this thing called the real world.

It contains much computing equipment, some of it functioning, and is an area where no cat or wife dare tread – partly because of my stern gaze and impressive frame, but also because they don't want to get lost in the heaps of paper and photocopied manuals therein. The only life forms within are me and a Swiss cheese plant – until the cats see me using the keyboard. This, in cat society, is almost as bad an insult as trying to read a newspaper. Accordingly they walk on the keyboard. And "fall off".

A fair mailbag this month, though keep on sending stuff in. The postman just managed to squeeze it through the letterbox, but apparently used a crowbar and 14lb sledgehammer.

Most mail, however, survived, including one from John "Hak Man" Girvin. This does for Spindizzy what John Stalker did for the RUC. Unfortunately, this document too was stamped on by a higher authority. The writing on the first page (in XL Magic Marker) reads "Not for publication – Ed". So, John, it was at least good enough to qualify a response. I'll stick it in the big black file until after the glorious revolution.

Machine's a must

Mark Delaney of Liverpool has been valiantly trying to get to grips with the programs on the 6128 giveaway 4-pack. This means he isn't quite there yet. Well, Mark, programming is a lot more difficult than you think. There is no way to convert programs from binary form on the 6128 into Basic. It's a tough world, and you're just going to have to learn machine code. The firmware manual can be bought from the User Club. Phone 091-510 8787.

To help you out, your first two discs in the set will not run on a friend's 464 if you just do a RUN"DISC. The DISC program has a clever bit in it which loads pretty pictures into the 6128's extra memory. Cliff wrote it, and I remember him spending hours fiddling with the emulator to get the right piccy.

Still, here is a list of the names to put after RUN" if you want to use the discs on a 464 or 664. All the other discs should work as advertised:

Disc 1
Side 1 DOORSOFD HUNCH2 D1
Side 2 RITLOAD NOMLOAD H1LOADER

Disc 2
Side 1 QABBALAH PRIZE D2
Side 2 TUBARUBA BASEBALL SHG DEMO EFG

Ian Davis from Brum writes in mentioning that his copy of Covenant doesn't get on well with our 6128 ram save/load poke from ages back. Have we stuffed the listing? If so, can the nice person who gave us the pokeykins contact us again?

The next one is a letter wot I nicked off of Lance Davis (amazing how letters float from office to office, innit?). A hip frood called Steven Patterson has got the general idea about playing Paperboy, and wishes to offer the following advice:

- When coming up to the kerb, get the wheels of the bike half on and half off the kerb. This will allow you to go past drains and walls next to the path.
- If you end up on the road, keep in to the kerb (you'll dodge cars this way). Go out into the middle of the road when a drain comes up, then go back into the kerbside.
- Keep most of your papers until you come to the church. Then slow down and fire all your papers at the gravestones. Remember to collect the papers next to the church.
- When trying to hit the men, slow down and fire slightly before you come into range.
- When on your fifth run watch out for radio-controlled cars and tyres on the kerb.
- At the end of the second street keep one or two papers for the assault course.

When in the assault course:

- **Hit as many targets as possible.**
- **Keep to the track on the right, and dodge the jumps in the middle of the walls.**
- **Hit the targets on the left by firing through the middle traffic cones and on the water jumps.**

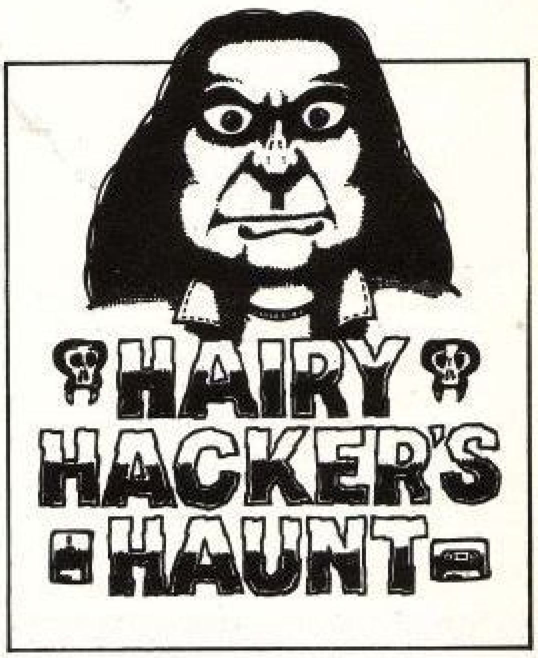
Amstrad Computer User wishes to point out that these driving hints are hazardous, and should not be practised by paperboys in the real world, whatever they're armed with.

By the way, if you send in letters to me, expect the reply to be published. I don't tend to write letters back often unless it is your lucky day, or the bribe is very large.

I do try to mention people though, unless they're repeating a poke from another mag, or sending in a golden oldie such as hitting the up key at the start of Roland in the Caves.

Letters come in from far and wide, and I'm not talking about Scunthorpe either. This next one is from a couple of folks in Istanbul. I've never had a letter from Istanbul before.

Anyhow, they ask if anyone has written a debugger/assembler that sits in the second bank of ram on a 6128. Good idea, eh? Anyone working on it?



Two Turkish pokettes were sent too. One for Chuckie Egg, which looks like this:

```
10 ' Ali Riza Ozoren
20 ' Chuckie Egg's Poke
30 MEMORY &8000
40 LOAD"chuck.bin",&8000
50 POKE &9CEF,n 'number between 0-255
60 CALL &9A97
```

and the other for Fruity Frank, which looks more like this:

```
10 ' Ufuk Senan Altinok
20 ' Fruity Frank's Poke
30 '
40 MEMORY &20FF
50 LOAD"fruity.bin",&1B00
60 POKE &2230,n:'number between 0-255
70 CALL &1B00
```

Their English isn't bad considering they've been influenced by reading the Hairy Hacker's Haunt. I look forward to hearing more from you folks.

How many of you lot have tried to copy files with FILECOPY on your 464? How many of you then discovered that it won't copy hidden files then?

Well, if you can't afford a decent file copier, you can do the Vax's magic FILECOPY mutater. First off, make a copy of your CP/M disc, and make sure there is a bit of room on it by deleting the

demo basic files.

Next, go into CP/M and type:

```
DDT FILECOPY.COM
```

This strange program called DDT (Diabolical Debugging Tool) then replies with:

```
DDT VERS 2.2
NEXT  PC
0C00  0100
```

You type S502 with a return, and it responds with 0502 28.

You type 18 followed by a return, and enter blank lines, zeros or a dot in the following fashion:

```
0503 04
0504 DD
0505 E5
0506 18 0
0507 08 0
0508 3A .
```

Then type S53D and continue as before:

```
053D 20 0
053E 15 0
053F E1 .
```

At this point you type Control-C, and the system thinks about it a bit before replying with the A> thing. You then type:

```
SAVE 12 VAXCOPY.COM
```

More chundering follows, and you then have a program on that disc called VAXCOPY. VAXCOPY works just like FILECOPY, but you can copy hidden files from any standard format disc to another.

As the protection bit is held in the middle of the last three characters of the filename, the names may look strange, but the copy will work fine.

6128 owners can use PIP B:=A:*.*[r to copy hidden files, but we aren't all that lucky.

Darn. Run out of letters an' ideas. I'll just give this cat (who has been excavating in my swiss cheese plant for purposes of sanitation) a bath, and then we'll get on with Justin's stuff, eh?

Right. Infinite lives for Firebird's Flying Shark.

```
10 ' Flying Shark. (c) Justin for ACU
20 MODE 1:MEMORY 12345
30 WINDOW #1,15,27,10,10:WINDOW#2,15,
   27,13,13
40 tot=0
50 FOR n=&80 TO &CB
60 READ a$:a=VAL("&"+a$)
70 POKE n,a:tot=tot+a
80 NEXT n
90 IF tot<>7574 THEN PRINT"Oh dear yo
   u'd better check the data.":END
100 LOAD "shark1",&3E00
110 CLS:CALL &80
120 DATA F3,2A,09,00,22,9D,00,21
130 DATA 91,00,22,09,00,FB,C3,00
140 DATA 3E,E5,F5,E1,E5,7C,FE,88
150 DATA 28,05,F1,E1,C3,00,00,3E
160 DATA C3,21,AD,00,32,96,BB,22
170 DATA 97,BB,C3,4B,01,2A,9D,00
180 DATA 22,09,00,CD,37,BD,21,BF
190 DATA 00,22,B6,01,C3,72,01,AF
200 DATA 6F,67,32,70,3B,22,71,3B
210 DATA C3,00,C0,4A
```

And lastly, infinite lives for Skate Rock (tape).

```
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&100 111
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>
80 LOAD ""
90 CALL &100
100 DATA 21,09,01,22,6f,90,c3,52
110 DATA 90,3d,b7,32,19,57,c3,0a
120 DATA 40,4a
```

Bye for now then, and remember: Network users do it in groups.

Vax & Suz

How to join: See Page 6

!! NOW SPEEDTRANS PLUS HAS EVEN MORE TO OFFER !!

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For CPC 6128 (or 464/664 with DK Tronics 64K (or larger) Memory)
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These latest Speedlock types can be identified by the whole screen flashing with horizontal bands of colour immediately after the first file has loaded. Do remember that **SPEEDTRANS PLUS2** does not save all the memory in the hope of having saved all the game. It saves exactly the right length of code. All screens are saved in compressed form – some as little as 4K (Basket Master) – thus saving even more disc space.

SPEEDTRANS PLUS2 is the most sophisticated Tape-to-Disc transfer utility for SPEEDLOCK protected programs ever published. It will certainly transfer more games than any other Speedlock transfer program on the market and with much greater ease. Other transfer programs require you to know how long the game code is so that you may run an alternative program for the long games which does not save the loading screen. This is done because they do not make use of the extra memory available on the CPC 6128 or from the use of and extra RAMPACK (DK Tronics 64K or greater.) This program is highly intelligent in that it first reads the loader from the tape and establishes which type of protection is in use from 6 alternatives. At the end of the load it then finds out how long the code is and if it is too long to be saved to one file it will move the excess code into the banked memory and save the game in two parts and write the appropriate loader program. The screen will also be moved into a bank and compressed before saving. This can mean screen files ans small as 4K (Basket Master) depending on mode and content. All this adds up to a lot less disc space being used than with other transfer programs and you will nearly always get the loading screen saved. The exception to this is when there is no loading screen (as in SCRABBLE) or when the screen is blanked out and more code is loaded into the screen memory, as in BMX SIMULATOR and MADBALLS for example. Try getting a screen with Multiface or any other imager. These imagers are only capable of saving what you have in memory at the time the button is pressed. What happens in multi part games? you have to press the button for each part thus wasting precious disc space. They also save far too much code and therefore waste even more space and saving too much code means longer loading times from disc. Programmers are now checking to see if you have an imager plugged in and if you have the program will not load. Imagers also have to be in place before you can reload your program and saved programs can only be reloaded in to the machine in which they are saved. **SPEEDTRANS PLUS2** creates totally stand-alone files and if you have another CPC even without extra memory they will run perfectly. It also displays the saving name on screen at the start of the load will all except the very latest games. In all cases the disc saving name is displayed while the save is carried out. To run the transferred game just RUN this name. Another intelligent feature of **SPEEDTRANS2** is that every first thing it does is to find out which drive it is in. This means that if you have a two drive system you may run the program from drive B by typing RUN "B:DISC" or B:RUN"DISC. However the saving will ALWAYS be to DRIVE A so with a single drive you must change the disc when prompted on screen

DISC:- UK £14.99 – EUROPE £16.25 – REST OF WORLD £17.00
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DMP 2000/2160/3000/3160

The printer buffer presently in the DMP 2000/3000 series is a 2K RAM. Most of this RAM is used by the printer's operating system leaving on average 1/2K as buffer space. Our upgrade kit contains a new static RAM chip which will increase the printer buffer by 6K (about 4 pages of text). This upgrade allows all Download Characters to be re-defined allowing the user to design special characters for use with scientific and other programs. The kit is supplied with full pictorial instructions to allow the amateur to carry out his own modification (the DMP2160 takes about 7 minutes). If you dont think you are up to it your local TV shop can do the job in approximately 15 minutes

UK £6.50 – EUROPE £7.75 R.of W. £8.50

C.ITOH M8510+ PRINTER

This printer is also labelled ACT Writer, NEC, DEC, Apple DMP, Digital LA50. We own one and have found it very good but totally Epson incompatible! We needed to do screen dumps and could not find a program suitable for it so we wrote one. If you have a CITOH and have been looking for a screen dump utility look no further. It gives a well shaded, full width and fully proportional dump.

TAPE:- UK £4.50 – EUROPE £5.75 – R. of W. £6.50
DISC :- UK £8.00 – EUROPE £9.25 – R.of W. £10.00

MANNESMAN/SHINWA SPIRIT/SEIKOSHA PRINTERS

We also have a screen dump program for the following printers: Mannesman Tally MT80 and MT80+, Tally Spirit MT80, Walters WM80, Sun SX80P, Seikosha SP80, Shinwa CP80/MY80/MM/SF80, Commodore CP80, 1526/4023/MP802, VC1516. It is possible that it will work on other printers of this type. This dump gives a well shaded screen dump.

TAPE :- UK £4.50 – EUROPE £5.75 R.of W. £6.50
DISC :- UK £8.00 – EUROPE £9.25 R.of W. £10.00

FIRETRANS

This utility will transfer a number of FIREBIRD programs from tape to disc automatically including most opening screens in full colour. FIRETRANS will work equally will from tape but will be more convienient to use if converted to disc with SAMSON/Transmat. It will transfer WILLOW PATTERN, RUNESTONE, CHIMERA, GUNSTAR, PARABOLA, REALM, SPIKY HAROLD, BOOTY, DONT PANIC, GUNFRIGHT, STARGLIDER, NINJA MASTER, HELICOPTER, and some versions of THRUST, HARVEY HEADBANGER and BOMBSCARE.

TAPE:- UK £5.00 – EUROPE £6.25 R.of W. £7.00
DISC:- UK £8.50 – EUROPE £9.75 – R.of W. £10.50

NEW COMPACTOR NEW

COMPACTOR will allow you to load a standard 17K screen, set the mode, border and ink colours and then save it as a compressed screen containing its own mode and ink colour information. Most screens compact down to an average of 9K which is an enormous saving on disc space. Loading time of compressed screens is also proportionately reduced

TAPE:- UK £5.00 – EUROPE £6.25 R.of W. £7.00
DISC:- UK £8.50 – EUROPE £9.75 – R. of W. £10.50

FAST FORMATTER

The **FASTFOMATTER** will format one side of a disc in approx. 30 seconds with the choice of DATA, VENDOR or SYSTEM and its much easier than using your CPM disc.

TAPE:- UK £4.50 – EUROPE £5.25 – R. of W. £6.50
DISC :- UK £8.00 – EUROPE £9.25 – R.of W. £10.00

TRANSIT

TRANSIT is a disc-to-disc file copier which handles files upto 40K in length in one pass. It will copy from drives A-A, A-B, B-B and B-A making an ideal utility for use with 5 1/4" second drive.

TAPE:- UK £4.50 – EUROPE £5.25 – R. of W. £6.50
DISC :- UK £8.00 – EUROPE £9.25 – R.of W. £10.00

QCLONE

QCLONE is a whole disc copier which copies by tracks and sectors allowing you to back-up your discs quickly and easily. Again it will handle all drive combinations. It will not, however, back-up discs with commercial protection.

TAPE:- UK £4.50 – EUROPE £5.25 – R. of W. £6.50
DISC :- UK £8.00 – EUROPE £9.25 – R.of W. £10.00

VIEWTEXT

VIEWTEXT is a utility that will allow you to load a Binary file into the computer and scan through its contents to see any passwords or word table and also any messages put in by the programmer. It is especially useful, when stuck in an adventure, to find passwords etc. which will help you to finish some difficult games.

TAPE:- UK £2.00 – EUROPE £3.25 – R. of W. £4.00
DISC :- UK £6.00 – EUROPE £7.25 – R.of W. £8.00

UTILITY DISC No. 1

This utility disc contains 5 programs, all menu driven. They are **SAMSON, TRANSIT, QCLONE, VIEWTEXT** and the fast disc **FORMATTER.**

DISC:- UK £15.50 – EUROPE £16.75 – R. of W. £17.50
ROM :- UK £17.25 – EUROPE £18.50 – R.of W. £19.25

3" PANASONIC DISC BOXES

Rumour has it that Amsoft/Panasonic no longer supply boxes with their discs. We have approx 1000 boxes remaining at 25 pence each. Regretfully we can only supply boxes if accompanied with a minimum order for Software/hardware of £15.00 unless extra monies are enclosed to cover postage

NEW NIRVANA NEW

Have you tried backing up your original expensive disc software and failed? Use NIRVANA before its too late! NIRVANA (meaning enlightenment) is an extremely powerful disc handling utility which has the following features: Disc to disc back-up copier which will handle most of the commercially protected discs available today. File copier for individual files. Disc formatter, much easier to use than CPM. Change file attributes. Erase files. Change filenames. Will handle all disc drive combination.

DISC:- UK £14.99 – EUROPE £16.25 – R. of W. £17.00

NEW SHAREPLAY NEW

THE STOCK MARKET SIMULATION
(ALL CPC's)

This is a serious educational program for 1 to 6 players and provides all the enjoyment of playing the stockmarket without any risk of personal bankruptcy!! Each player can buy and sell shares and the target is the first to reach £1,000,000. The program includes a stockholding portfolio listing the shares purchased, their number, cost and market value. Bank balances are also shown. Graphical representation of market fluctuations are given in the form of a bar graph. Also included is a high score table. Scores are automatically saved at the end of each session.

DISC:- UK £14.99 – EUROPE £16.25 – R. of W. £17.00

NEW WORDSEEK NEW

THE WORDSEARCH PROGRAM
(ALL CPC's)

This educational progam will tax even the most agile mind. The aim is to find the hidden words in a 15 by 15 puzzle within a set time limit of 30 seconds. The time limit is extended for every correct letter of the current word found. You may create your own puzzle consisting of up to 10 words which can be saved to disc and used at any time. You may only retain one puzzle at a time but if you choose not to use your own puzzle then the program will randomly select one from the library of 50 on the disc. All of the puzzles in the library are made up of 10 words each consisting of 1x8 letter, 1x7 letter 2x6 letter, 3x5 letter, 2x4 letter and 1x3 letter words. This ensures equal difficulty regardless which one is randomly loaded. The program contains a print option (for Epson compatible printers) allowing a hard copy to be made of any puzzle created. Keyboard/Joystick options are also available.

DISC ONLY:- UK £14.99 – EUROPE £16.25
REST OF THE WORLD £17.00

NEW TUNESMITH NEW

TUNESMITH is a simple to use sound utility which allows you to use the keyboard to play and record your tunes. No knowledge of music or Amstrad sound commands is required all you need to be able to do is whistle the tune you play or record. The octave and period of notes is variable and the program includes synthesiser and vibrato effects. **TUNESMITH** will save any tune as a basic file which can be RUN, CHAINED or MERGED into your own program

DISC :- UK £14.99 – EUROPE £16.25 R.of W. £17.00

SAMSON

SAMSON has been developed by us to transfer not only the normal programs but also many of todays where the code is much longer. **SAMSON** differs in many ways from other Tape-to-Disc utilities, the main differences being: * SAMSON retains original file suffixes (SAMSON. SCN will be saved as SAMSON . SCN) * Improved file relocation method * Elaborate Tape-read/Disc-write system which reduces Tape Motor, Slave Relay and Disc Drive Motor wear substantially. * A large reduction in tape transfer time is also achieved in all but a few cases * NEW "SPLIT" option for todays longer games (we will be using this option in future routines) * All file information is displayed on screen and can be echoed to your printer if needed. SAMSON also transfers itself to disc.

TAPE:- UK £7.50 – EUROPE £8.75 – R. of W. £9.50
DISC :- UK £11.50– EUROPE £12.75 R.of W. £13.50

CHARACTER DESIGNER

(ALL CPC's)

- **REDEFINE YOUR PRINTER DOWNLOAD CHARACTERS**
- **REDEFINE THE COMPUTER SCREEN FONT**
- **REDEFINE ANY/ALL KEYBOARD KEYS (ASWERTY)**
- **DESIGN SPECIAL SCIENTIFIC CHARACTERS/FONTS**

Takes all the hard work out of character designing making it a pleasure. The printer part of the program will only work if your printer is capable of DOWNLOADING and is EPSON compatible – see your printer manual. Works with 7-bit or 8-bit output (8-bit port). All the designing is done "On-Screen" so you can see exactly what you are doing. You can save your newly designed characters to disc and reload them at any time into a basic program and into most Word-Processors. The program also allows the user to redefine any or all of the keys on the keyboard. This feature will be useful for those who require an ASWERTY keyboard. The disc also contains twelve sample fonts for experimentation.

TAPE:- UK £7.99 – EUROPE £9.25 – R. of W. £10.00
DISC :- UK £11.99 – EUROPE £13.25 R.of W. £14.00

DISC HEAD CLEANING KIT

Stocks of these 3" head cleaning kits should arrive within the next few days. HIGHLY RECOMMENDED

UK £8.00 – EUROPE £9.50 – R.of W. £10.00

Please send your cheque (£ Sterling) Eurocheque OR UK P.O. to
GOLDMARK SYSTEMS, 51 COMET ROAD, HATFIELD, HERTFORDSHIRE, AL10 0SY. ENGLAND
Please write or telephone 07072 71529 for further information

DRILLER SOLVED

Following his successful drilling mission on Mitral, Lesleigh Skerrit refused all publicity. Our special correspondent, Pat Winstanley, persuaded him to break his vow of silence.

WELL, there I was on the surface of Mitral. It seemed it was up to me to release all the gas trapped under the surface of this moon. With 18 sectors to clear, and only four hours to do it in, it looked like being a tight schedule. Still, this was the sort of thing I'd been trained for, and here was my opportunity.

Basalt

Initially the block defeated my attempts, but after a little exploration I was walking on air, having cleared the sector of gas. I shot the tree down, but on the way out, after investigating the spot where the tree had been, I bumped into the end of a wall. I tripped the switch, then returned to Beryl, toggled the hidden doors, then out near the teleport to Aquamarine.

Lapis lazuli

At first the way seemed blocked, but the pyramids succumbed to my greater firepower. Once through the maze I decided to drill, then moved towards a low wall. With a bit of a stretch I was able to toggle a switch and made it into Emerald, but the beacons there are somewhat overwhelming. I beat a retreat back to Amethyst where I moved through a blank wall.

Opal

I followed the instructions for positioning the rig. Mind you, it was a bit tight. Then I went through the back wall to investigate.

Ochre

Now here's a funny thing, the force field I'd noticed earlier had gone. Must have switched it off in my wanderings.

Topaz

The beacon attacked. I shot it and it turned away. I shot one of the two small cubes to gain access to the suspended building, where constant shooting replenished my reserves. Close scrutiny of the walls produced access to Amethyst again, but indoors this time. I shot all the cubes, then went back to Topaz and down from the suspended building. I positioned the rig, keeping a wary eye on the beacon just below. Then off to Beryl.

Beryl

The beacon here was vicious. To enter the building I chopped its power off. Matching symbols proved the key to three prior access difficulties. Once I got trapped inside, but a quick repeat opened the door again. Outside I paused near the pillar to admire the construction before going through the nearby door to Basalt.

Amethyst

I shot the dividing wall but saved the pillar for my return visit in the jet. It was just as well really, as my investigation of the platform on top of the pillar later proved. I shot a small cube to open a door in a wall, and in the shed I shot the floor crystals first, then the supporting pillars. Having positioned the rig successfully, I entered a nearby doorway.

Aquamarine

To be on the safe side I shot through the cracks in the door in case something was lurking. Then I opened the right-hand hanger and went in under the jet. I rose a little, and the docking swap was completed.

Now that I'd gained the freedom of the skies I went off to get a good look at the rest of Mitral. I found a couple of platforms apparently inaccessible, and no drilling was possible, but the opportunity for mapping was too good to be missed.

In Malachite I had a run-in with some beacons inside a suspended block, but succeeded in tripping the switch. I also made an interesting discovery in Graphite, where I flew into a suspended block with devastating results.

While mapping, I tripped the wall switches in Quartz, Alabaster and Opal, which opened Diamond up for later exploration in the probe. I found a wall switch in Ochre too, but it didn't seem to help at that stage. My mapping operation finished, I flew back to the probe to continue the drilling. The positioning was obvious in Aquamarine.

Ruby

I happened to be lined up with an arrow on entering Ruby – just as well looking at the drop. There was a vicious looking beacon in the middle of the sector, but as it didn't react on entering the sector I left it alone – no sense in advertising my prescence. I shortened my stride and watched my step turning corners then placed the rig without difficulty. It could have been awkward getting out of Ruby, but a quick trip around the teleport system solved the problem.

Malachite

I had to look up quickly to stop the beacons wiping me out, but picked up much-needed supplies here before passing through to a maze of some sort which seemed to have no purpose at all because there was nothing in it. I left a mark in the centre, then blew the walls away.

Graphite

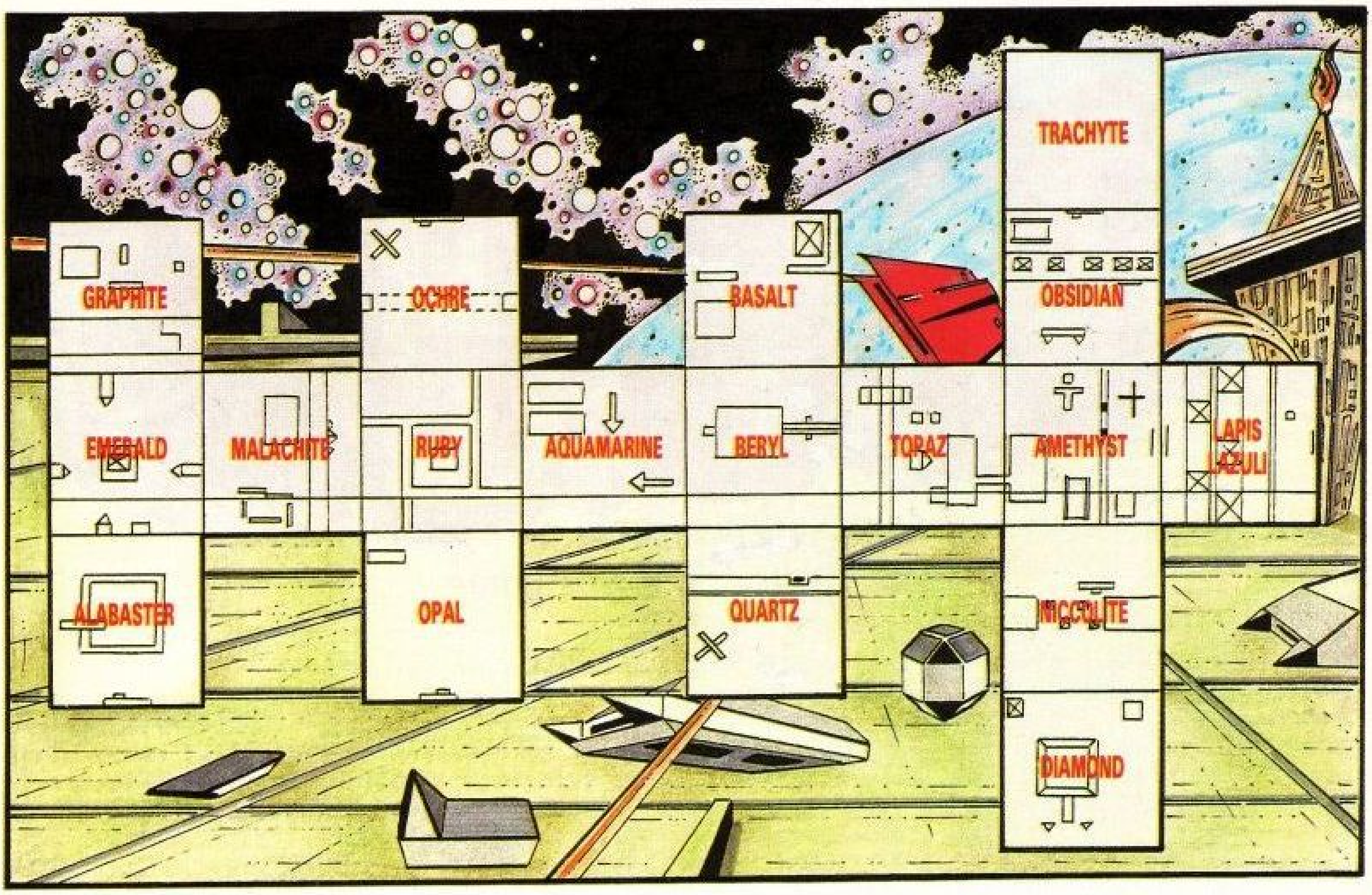
The path through the gravel proved awkward, but possible with care, and necessary. It took me ages to find the right spot for drilling. And it was just as well that Graphite is on the dark side or I'd have been fried now that the suspended block had gone. The block arrangement here reminded me of an old fashioned gunsight, so I took a chance and shot. Coming back out my steering went again and I demolished a cube. Before leaving Graphite I tripped the wall switch.

GENERAL HINTS

Use both sides of the teleport structure in Amethyst if you are trapped by a rig in Ruby.

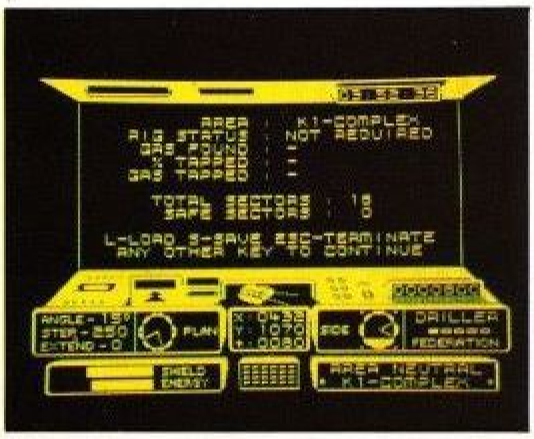
Use joystick and cursor simultaneously for double speed movement. The jet is vital for movement in Graphite and Malachite.

Hold the fire button down when moving the crosshair for pixel accuracy (try shooting the floor in Obsidian and Opal).



Niccolite

I shot a switch on a wall then braved the minefield to look behind some buildings. There was no cross. I checked my briefing. Rig positioned I made my way back to Amethyst and passed through a doorway beneath a suspended building.



THE THREE SWITCHES

ONE

Disables force field in ochre. a) Malachite – shoot block in suspended structure b) Graphite – drive over cube

TWO

Allows access to Diamond from Opal. Shoot the wall switches in Niccolite, Alabaster, Quartz and Opal.

THREE

Allows access to Trachyte (the final sector) from Obsidian. Shoot the wall switches in Graphite, Obsidian, Basalt and Ochre.

Alabaster

What weird water in the pool – it evaporated without the clouds of steam I'd expected. The floor of the pool was totally dry when I went down to continue my mission.

Diamond

Beacons quickly disabled so into the tunnel. Repeated shooting at the symbol seemed ineffective, but reckless driving gave results and a spot for drilling too. Must be slipping – drove into the crystals too!



Emerald

I couldn't find any way to disable the beacons here, but by hugging the walls I gave them very little opportunity to see me. I did make one mad dash to the centre, which was very profitable as it turned out.

Quartz

The beacon here stood under a precariously supported slab. Squeezing past enabled me to find the rig position marked.

Obsidian

The twin beacons caused little difficulty, and a quick shove soon gave me a way to cross the crevass, where I replenished my supplies. Only one platform was still accessible. It was on the other side of the back wall. That much was obvious, but careful searching failed to uncover a switch.

Then inspiration struck. So far I'd positioned 16 rigs and a number on a wall provided me with the final clue. Mind you, it was a long time before I figured it out, and when realisation hit I laughed hard.

Trachyte

So, there I was in the final sector, my mission almost complete, Mitral almost saved from oblivion. I studied the landscape and moved towards what looked a promising position to dronigon

*** beep * faulty transmission**
*** beep * checking circuits**

Amak o kolymis upsug e barrop. Enkle lis fidde ary umk, lokil pee morris minor flurgle lee wop. Arn choo amak, widdle uny o plim ce donk, arrib ni floffi upsug nart

*** beep * faulty circuit found and repaired**

And that was how I did it.

THE HEIGHT OF PERFECTION

Simon Rockman gets an eyeful of Hewson's tower game

I AM pretty chuffed that Hewson has released Amstrad Nebulus. It is a game I pestered Andrew Hewson to have converted to the Amstrad. He claimed that it would be too slow. I spoke to Chris Wood, sometime *ACU* contributor and Amstrad expert, who thought he could get the speed up. So I gave Andrew Chris's number and Chris Andrew's.

The result is a game for which the Commodore and Spectrum versions won a major industry award. Chris has made the Amstrad version, prettier, slicker and every bit as much fun.

Simple ideas are the best

The story is simple. You are a small half pig, half frog-like creature given the task of overcoming evil towers each between four and six screens high. If you climb to the top the tower will be destroyed. Destroy all eight towers to win.

Like television's famous Fred Dibner, you must scale the outside. There are stone ledges around the perimeter of the tower which spiral upwards. Simply hop from ledge to ledge to get to the top.

Well that would make a dull game. The tower may rotate smoothly and the ledges may be excruciatingly pretty, but graphics do not make a game in themselves, whatever Cinemaware says. So to provide a challenge there are nasty creatures, denizens of the tower.

The first tower, the tower of eyes, has cyclops-like aliens. Other nasties to avoid are the yellow robots, the glass bubbles which can be frozen with a single shot, and cherry red balls which can be completely destroyed.

The alien you will learn to hate is small, red and flies around the tower. This was supposed to be a bird, but the programmers at Hewson couldn't get the graphics quite right, so the bird became a pile of blobs.

Up and around

A spiral staircase and a few aliens would not be much of a challenge to the average Konix juggler, so there are extra problems. The staircase has bits missing. You can jump over holes which are one ledge wide but bigger gaps require more drastic action.

Doorways lead through the tower, often to the next set of steps. Great strides can be made in your progress up the tower by using a lift. Sometimes you may find that there is no way up and the ledge below may be more profitable. When this happens you need an alien to hit you.

Only falling all the way to the bottom of the tower and into the water below will lead to your loosing a life. Otherwise contact with an alien is painful – not deadly – and you fall to a ledge below.

Pogo is not equally balanced, so just turning round on the spot can make him fall. He's not what you could call a pretty creature, but beautifully animated.

There are 74 frames, divided up into sections like walking in each direction, turning round, tumbling in each direction and falling.

Chris describes the other aliens as "eyes, robots, spinning things and other spinning things which look very pretty but we haven't thought of names for them yet, probably never will. They kill you all the same".

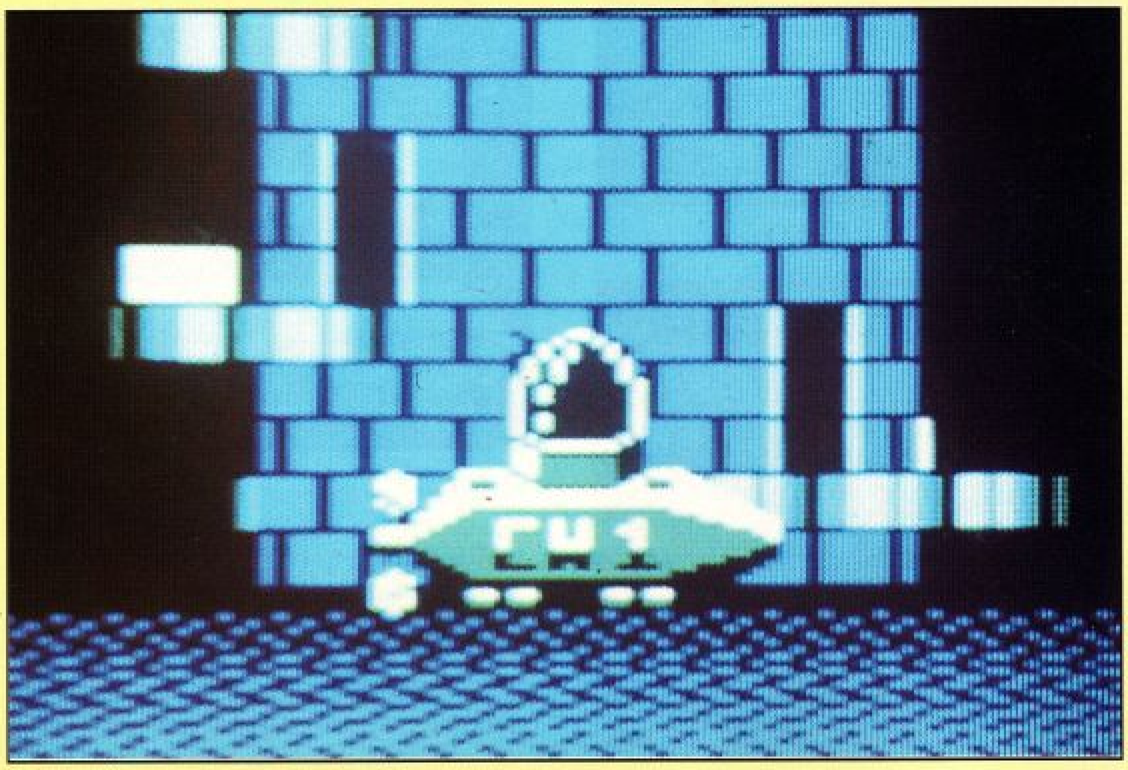
Nebulus took three months to convert, although, like most programmers, Chris says that if he was starting again he would do things very differently. He may well get the chance to do so because his next job for Hewson is to convert the game for the 16 bit machines.

Like all Chris's games Nebulus was written on a Joyce (PCW8512) using Devpac 80 version 2. He likes this set-up "because it allows me to assemble to 3in disc on the PCW and then pop it in the 6128 to run it".

The program is big, there is over 290k of source code and it takes more than three minutes to assemble. Chris will usually spend this time riding his unicycle or juggling. He sometimes does both at once.

The object code is so big that it fills the CPC and knocks out the firmware. Just to load the code in he has to use a direct sector read routine which was written by ZZKJ, another *ACU* contributor of long standing.

The main problem with the conversion was, as Andrew Hewson correctly observed, speed. The Amstrad version can just about keep up with the





Spectrum's frame rate of 17 frames per second. The difference is only really noticeable when Pogo walks through a door and the whole tower rotates.

The result is that not only does the Amstrad version look much prettier and sound much better than the Speccy one but it plays just as well. Credit for the sound goes to Dave Rodgers who honed his routines to use less and less processing time, halving the raster period it needed during the time it took Chris to write the game. All the music fits into a shade under 3k, but it sounds great.

The game was designed flat and then wrapped around the cylinder. What makes a ledge disappear as it goes round is a routine which draws the nearer ones so they overwrite the further ones.

To hide the aliens behind the tower is more complicated. The position of the aliens is calculated as though the tower was unrolled, a table holds the possible positions and then a clever bit of code uses a 16 level depth comparison table to wrap the whole lot around the tower.

Nebulus was written for the Commodore 64 and the Spectrum by John Philips, who made his



name in the Amstrad world with Impossiball. The two games share the Hewson trademark of being highly original and well programmed. It is strange that Hewson can manage to produce so many simple yet electrifying and original games which the big companies fail to deliver. With a special distribution deal through Gremlin Graphics, Hewson games should become easier to find, so look for Nebulus in the shops and in the charts.



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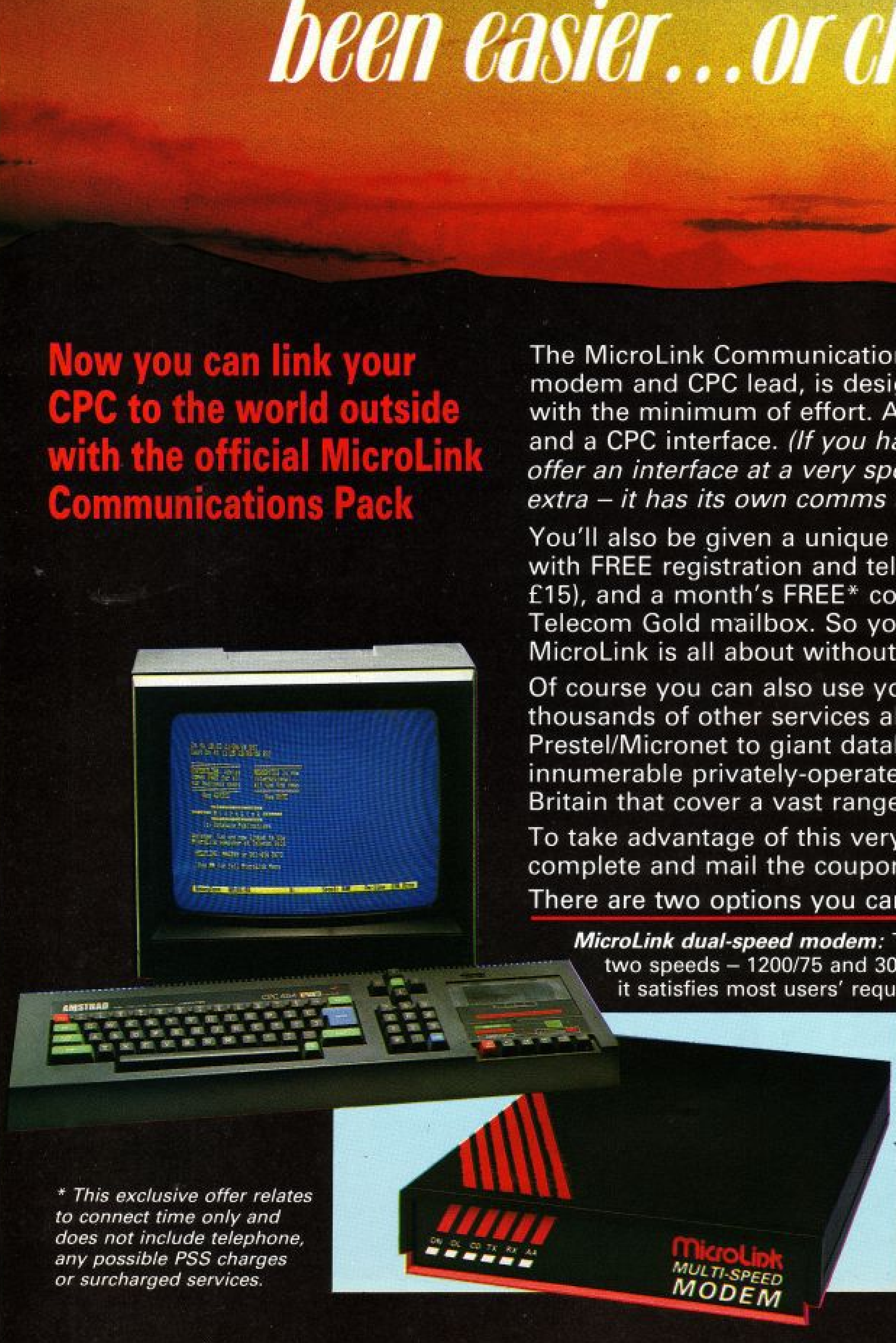
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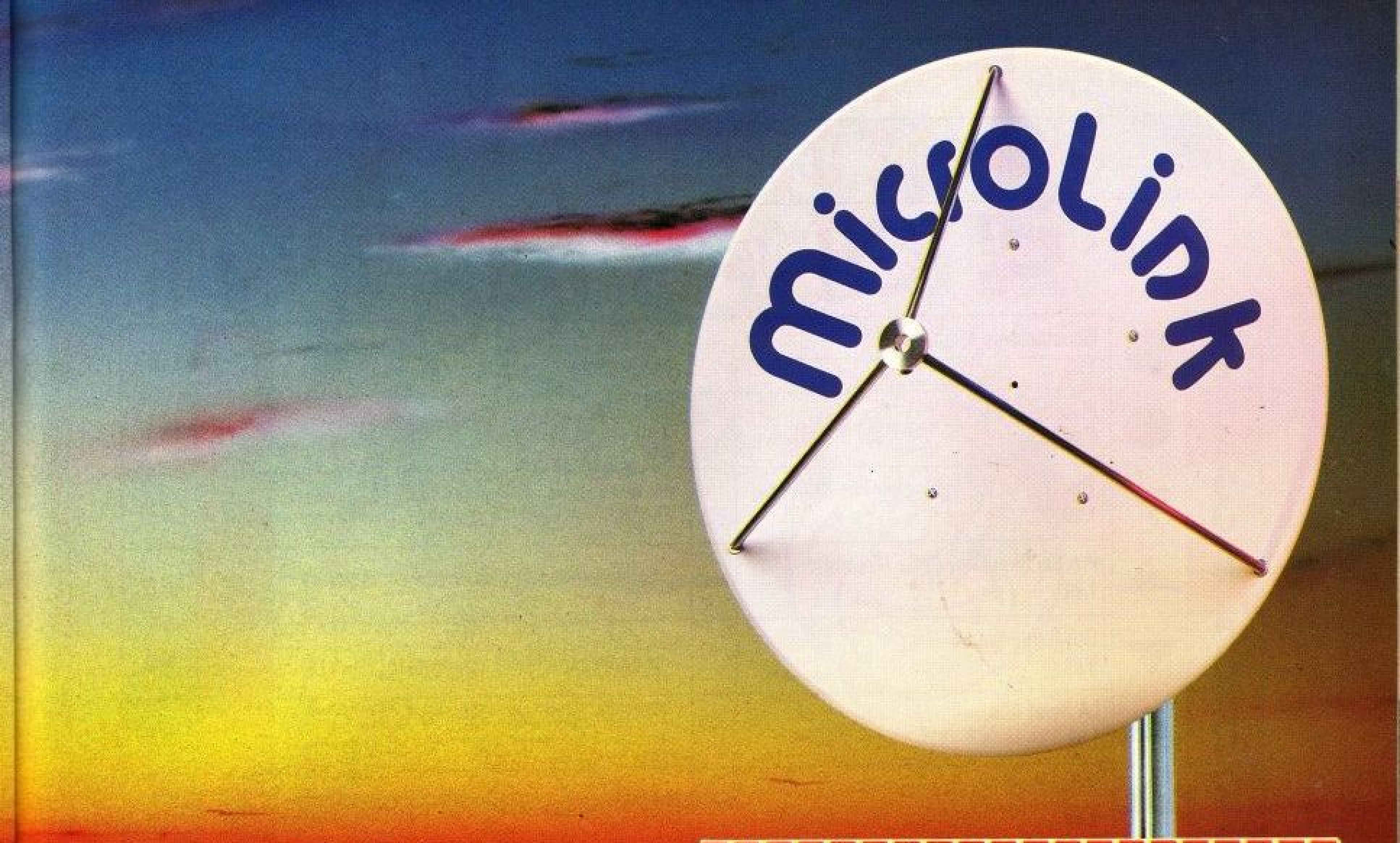
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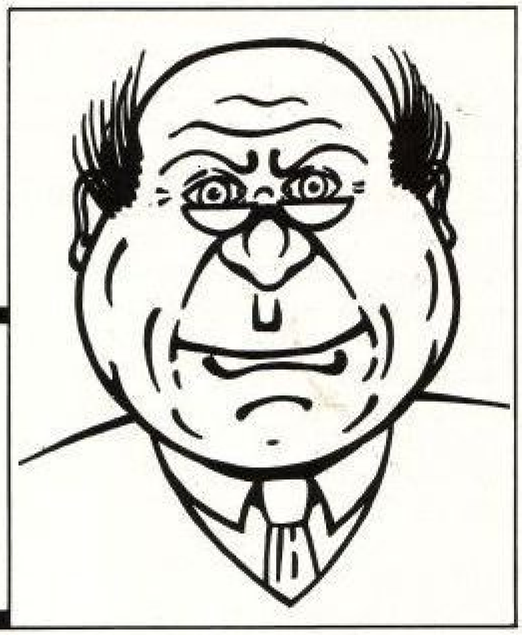

MicroLink

GALLUP SOFTWARE CHART

Pos	Move	Title	Comment	Last month	Market strength
1	New entry	**Ghostbusters** *Mastertonic* 1.99	Great film, great music, great price. Shame about the conversion.	NE	100
2	New entry	**Platoon** *Ocean* 9.95	Gimmicky and bloodthirsty Ocean title. Very hard to get into, but still good.	NE	75
3	Down	**The Way of the Exploding Fist** *Richochet* 1.99	The karate game which started it all. IK+ is better, but this is a cheap bit of computer game history.	2	72
4	Up	**Pro Ski Simulator** *Code Masters* 1.99	Still on the piste, but a poor game by Code Masters' standards.	6	69
5	Down	**Out Run** *Sega US Gold* 9.99	Running out of steam quickly this one, and deservedly so after two months at the top.	1	60
6	Up	**LA Swat** *Mastertronic* 1.99	Patrol the streets, watch out for muggers and terrorists, shoot to kill, but try to avoid innocent bystanders. Reviewed this issue, it won't get much higher.	9	56
7	Up	**Skate Rock** *Mastertronic* 1.99	Bubble Bus programmed Mode 0 game. All skate and no rock. How did it get this high up the chart?	20	55
8	New entry	**Predator** *Activision* 9.99	The game of the Schwarzenegger movie. The name's bigger than the game, and about as boring.	NE	54
9	Down	**Grand Prix Simulator** *Code Masters* 1.99	Why buy Super Sprint when this is better and cheaper? Why buy this when Jet Bike Simulator is so very much better?	3	53
10	Up	**BMX Simulator** *Code Masters* 1.99	A totally RAD game for those with a penchant for pedalling. Jump the ramps, race a friend. Go for it. Been around a very long time, and it's still hanging in there.	13	51
11	Down	**Trap Door** *Alternative* 1.99	Berk, Druk and Boney star in a game which is the firm favourite with the Rawlins family. (They can go down, but they can't get up again). Great animation but tricky to play.	4	50
12	Down	**3D Starfighter** *Code Masters* 1.99	Billed as the first shoot-'em-up from the Olliver twins, a surprisingly deep budget title with solar systems to navigate around and convoys to defend.	5	48
13	New entry	**Steve Davis Snooker** *Blue Ribbon* 1.99	The original full-price version has sold more than 180,000 copies to date. Tests the cuemanship of even the most expert player.	NE	47
14	Down	**Jet Bike Simulator** *Code Masters* 1.99	The most playable racing game on the CPC. Great courses, top notch collision detection.	11	46
15	Down	**Dizzy** *Code Masters* 1.99	Budget Sorcery. Not exactly the Darling's finest hour. Sometimes price doesn't matter. In this case two quid can be better spent elsewhere.	10	45
16	New entry	**Popeye** *Alternative* 1.99	Fun and frolics with Bluto, Olive Oyl, et al. The price is right.	NE	43
17	Down	**Ghost Hunters** *Code Masters* 1.99	Early Ollivers spritey game. Well liked, but beginning to look a little dated now.	16	40
18	Non-mover	**Soccer Boss** *Alternative* 1.99	You too can be Bob Maxwell and control the whole first division if you like. No options to buy teams from rock stars though. Simple but absorbing.	18	36
19	Down	**Magnificent 7** *Ocean* 9.95	Actually eight games. Head over Heels, Cobra, Short Circuit, Frankie goes to Hollywood, Arkanoid, Wizball, The Great Escape and Yie Ar Kung Fu.	7	35
20	New entry	**Thai Boxing** *Micro Selection* 1.99	Gloves off for another budget bout with some foreign chappies.	NE	33

Non-mover — Up — Down — New entry

Applications advice



Printers feature very prominently this month. David Foster is on line to answer your questions.

BEFORE getting around to "solving" a few problems, I have received a number of letters following my recent article on educational software asking whether I could recommend some databases, word processors and spreadsheets that would be suitable for use by children.

So many programs are available that would suit the relatively straightforward uses to which they would be put that I think it would be unfair to recommend one in preference to another. Instead, I would like to suggest one or two points to consider when choosing such programs.

Almost any word processor could provide the facilities required, but I would look for one that has commands that are logical and well thought out. For example, I find it far easier to remember that Control-F is used to format a paragraph, than the function key F8.

I like consistency, too. I know of programs that require you to use Control and a letter key for some functions, but others require pressing Escape and a letter key.

When choosing a database I would look for a program that uses a common method of entry of details so that once children have learned the general principle they can easily work out the others when needed.

I also feel it is important that the database allows you to design your own forms and report layouts, so you can initially create a working database that takes the form of a computerised equivalent of a manual filing system. It is much easier for children to understand what is going on if they can relate it to something they already know, such as a card index.

Spreadsheets are a bit more difficult to relate to something that children already know, as the concept is slightly different, but the choice of spreadsheets is somewhat smaller, and therefore easier. Again, consistency in the use of commands is important.

Because the initial requirements are relatively small, it may be tempting to buy the cheapest programs available, but you should consider whether the child will find the programs convenient to use and whether he or she will quickly grow out of them.

The fact that a program contains a lot of features does not necessarily mean that it is any harder to use, merely that you may not, at first, make use of all of the facilities.

I think it is important that you do a bit of homework yourself before handing the program over to a child. You should make sure that you know how to use it – or at least enough of it to get started.

It is also important to have it already in a working state. A short letter prepared on a word processor, a small database containing a few records or a spreadsheet containing figures, all make it much easier to explain the intended object of the exercise to the child.

Try to choose something connected with the child's hobby or hobbies. Perhaps a database for a stamp or record collection. Perhaps a spreadsheet to work out how they spend their pocket money. Choose items they know and understand so that they only need to learn how to use the program, not the subject it is to be used with.

Figure I lists some of the more commonly available programs of each type. It is not comprehensive, and I make no recommendations by virtue of having included a program in the list. I would recommend, however, that you make sure you are able to try out the program before buying it. If you find it easy to come to grips with, then almost certainly your children will. In fact they will probably find it easier than you do.

WORD PROCESSORS

Brunword (includes a spelling checker and simple database)
Mini Office II (includes spreadsheet, database and other programs)
Protext (integrated spelling checker, mailmerge and filing/invoicing programs also available)
Tasword (spelling checker also available)
Wordstar (A long established program – runs under CP/M)

DATABASES

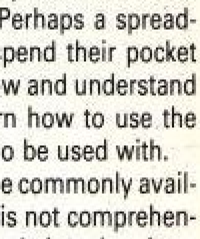
AtLast Plus (CPC6128 only. Original AtLast may still be available and runs on 464 as well – runs under CP/M)
dBase II (A very powerful, but not over-friendly database)
Masterfile III (CPC6128 only. Masterfile 464 may also still be available – runs under Amsdos)
Mini Office II (see under word processors)

SPREADSHEETS

Mastercalc 128 (CPC6128 only – Masterfile 464 may still be available for 464/664 users)
Mini Office II (see under word processors)
Supercalc (A heavyweight spreadsheet running under CP/M)

Figure I: Some of the many programs that may be considered when selecting a program for children to use

Printer underlining



J.Mackintosh from Devon is having trouble getting his DMP2000 printer to underline text when using both Mini Office II and a Basic word processor. The reason is that he is trying to make use of the underline character on the keyboard (shifted zero) instead of the codes required to turn underlining on and off, which are ESC,"–",1 and ESC,"–",0 (or in numeric form: 27,45,1 and 27,45,0).

In Mini Office II you should press f1 when you want to start underlining, then enter the codes in

numeric form, separated by a comma, then continue with the text to be underlined before repeating the process with the off codes when you want to stop underlining.

The arrangement is not entirely satisfactory as the spaces that are occupied by the numbers will be replaced by spaces on the page when the document is printed out, but this is the way the program was designed and there is little that can be done about it.

To achieve underlining from Basic, it is necessary to send the codes to the printer in the form:

```
PRINT#8,CHR$(27);CHR$(45);CHR$(n)
```

where n=1 for on and n=0 for off.

I also received a letter from John Hudson of Huddersfield in response to my earlier advice on using printer codes with Mini Office II.

He tells me that there are actually two versions of Mini Office II and that mine must be the later version as it uses f1 to insert codes. He says that the earlier version requires Shift and f1 pressing before entering the codes in the way described above.

Mr Hudson also enclosed a list of the codes required on the DMP2000 to produce various print styles. This is reproduced in Figure II and makes a handy reference list. As the DMP2000 is Epson-compatible, the codes should suit many other printers as well.

Action	On	Off
Reset printer	27,64	–
NLQ	27,120,1	27,120,0
Proportional	27,112,1	27,112,0
Condensed	15	18
Elite	27,77	27,80
Italic	27,52	27,53
Bold	27,69	27,70
Double strike	27,71	27,72
Underline	27,45,1	27,45,0
Superscript	27,83,0	27,84
Subscript	27,83,1	27,84

Figure II: Commonly used Amstrad DMP2000 printer control codes

Alan Pearce from Pershore is also having trouble underlining, but this time the problem is the Silver Reed typewriter, which is not capable of doing underlining other than by doing a second pass over the text using the underline character. I covered this subject in an earlier issue with regard to another model of Silver Reed printer. Unfortunately, with Tasword (which he uses) this is not readily done, so I am afraid there is no easy solution to the problem.

Mini Office II page skips

Jim Longworth from Midhurst has written offering a tip for Mini Office II. It concerns the problem of page lengths getting out of syncronisation when printing more than one copy of a multi-page document.

Apparently, if you select Printer Options and set the number of lines per page to 61, it will print correctly. This maybe confirms that there is more than one version of Mini Office II, because it doesn't work with mine, although he assures me it does with his.

Jim also asks how you can suppress page-skipping when printing labels with continuous stationery. I suspect that his problem is caused by the printer being set to produce a skipover when in continuous printing mode.

I do not have a DMP2000, so have not been able to try it, but the label printing program includes the facility to send codes to the printer. I would try sending the codes 27,79, which are the codes to set skipover to zero.

Qualitas and 8 bit printer ports

J. Williams of Chichester comments on the fact that when you use the fix for using Qualitas with Promerge Plus, it kills the ability to use background printing, and asks whether there is a solution to this problem.

I think this is because the background printing and Qualitas are intercepting the same address in Protext – Promerge to send text to the printer, and Qualitas to send what it thinks should be sent. I do not have an answer to this, but shall try to find one.

Mr Williams also comments on the fact that underlining clashes with the bottom of the text, and wonders whether an 8 bit printer port would solve the problem. The answer is yes I suspect, but should be able to confirm this when I get the KDS 8 bit port to test.

I have received a number of letters asking exactly what an 8 bit printer port is and where they can obtain one. As far as I know, currently the only manufacturer is KDS Electronics (04853 2076) who have recently produced a new version that is also fully compatible with CP/M 2.2 and CP/M Plus. They have promised to send me one to review.

In a recent column I answered a question about whether it was possible to use Qualitas with Masterfile III, at which time I said that it wasn't. Subsequently I am informed by Seven Stars Publishing, the authors of Qualitas, that it is in fact possible, and an applications note covering the necessary alterations is available either from Campbell Systems or from Seven Stars Publishing (sae please, it says).

Small business on the 464

Mrs W. Winstanley from Westbury has written saying that they have a small business and want to make use of their CPC464 to help with producing invoices and estimates. She also asks what sort of printer they should get.

She does not mention in the letter whether they have a disc drive, but if not, I would suggest that if they are going to do any appreciable amount of work with the 464, a disc drive is a must for reasons of both convenience and safety of stored information.

While tapes are fairly reliable, you are less likely to keep backups of important information because they are slow to load and save.

Many printers are suitable, and I would recommend that they purchase one that provides near letter quality and uses Epson-compatible codes. Most printer manufacturers now produce a printer, or printers, that fit within that specification and the final choice should probably be made on price, quality and characters-per- second printing speed (cps). Some of the better known names are Epson, Citizen, Star and Panasonic, although there are many others.

Without knowing the volume of invoices and quotations, it is a little hard to recommend specific software, but as the business is apparently small I would have thought that a word processing program ought to be able to provide all the necessary facilities.

My favourite is Protext, and Arnor have recently announced an additional program, Protext Office, for use with Protext and Promerge. It enables you to create and calculate invoices with the minimum of effort.

Screen dumps and colour printer/plotters

Mr E. Dennis of Farnborough has a four-colour printer/plotter. He is concerned that while it works perfectly with the CPC6128 when printing text, it will not produce a screen dump when used with Rembrandt. Unfortunately Rembrandt is only supplied with two printer driver options, one for the DMP1 and one for Epson-compatibles, and Mr Dennis' printer is neither of these types.

There is no easy answer to this problem as it is a case of the software not being compatible with the printer. I think it highly unlikely that he will find a graphics dump program that will work with his printer. Perhaps he can persuade Beebugsoft to create a driver for him?

Printing lines with Masterfile

D. Bagshawe of Bristol has used Masterfile to produce intricate formats, complete with lines, boxes and inverse headings, but finds that he can only get the text printed with the fancy bits if he uses the built-in screen dump feature of Masterfile, and that only produces a small screen dump. He wants to know how he can get a full size dump, complete with all the details.

Unfortunately there is no way that this can be done from within Masterfile, as the normal output is a straightforward text printout. The manual does mention the fact that these features are really intended only for visual on-screen effects.

As far as I know, apart from writing a special screen dump program that could interrupt the operation of Masterfile when a specific key combination was pressed, the only other way to do this would be to use one of the hardware add-ons primarily intended for copying programs, some of which incorporate the facility to grab the contents of the screen at the press of a button.

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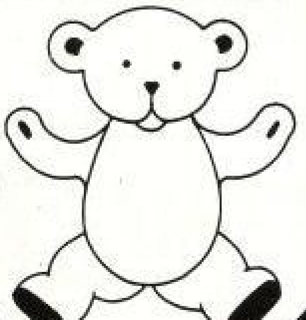
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Or load the supplied invoice pattern and modify as necessary. Go to the database. Select and mark the items. Set the quantities. Select the Customer address. Press T for Transfer. The invoice pattern expands to fit the data, calculating a running total as it proceeds. The total can be printed at the end of each line as it accumulates or just as a final total at the bottom. Print the total Ex VAT, print the VAT, print the total with the VAT and even show the amount if split into several payments.

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BrunSpell is the fastest and most convenient CPC spelling checker. Even the 464 version is faster than Prospell on ROM. BrunSpell 464 is supercharged to 1700 words/minute, including dictionary loading time but BrunSpell 6128 is the champion at 2500 words per minute. Brunspell 6128 and the 30,000 word dictionary are loaded at the same time as BrunWord and the total loading time is only 10 seconds. Why be slowed down with Protext/Prospell on ROM!

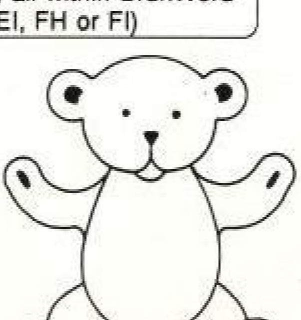
DataFile

DataFile is specially written to complement BrunWord and is a card filing programme with very fast access. BrunWord justifies the text before printing. Labels, reports, personalised letters – DataFile has unlimited print formats using BrunWord.

How BrunWord Compares

Take as an example the justification process. Tasword uses an out dated method where spaces are added only from the right hand side. This has the effect of making the lines appear to stretch across the page. The Tasword system should be much faster but in fact Tasword takes 19 seconds for a 306 word paragraph while BrunWord takes just 1.5 seconds.
Tas-spell has a similarly disappointing performance. The text of our free booklet was checked by Tas-spell after the 37 unknown words had been saved, and it took a staggering 18 minutes and 31 seconds for the 3455 words. BrunSpell took just 1 minute 21 seconds for the same test.

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Cutting through the logic

Jeff Walker finds that (2b OR (NOT 2b)) = the question



"If it was so, it might be; and if it were so, it would be: but as it isn't, it ain't. That's logic."

SO said Tweedledee in Lewis Carroll's Through the Looking-Glass, but, then again, Tweedledee never had a CPC. For a newcomer to the game, logic is without doubt the largest and most difficult concept of computer programming to grasp, because it manifests itself in so many forms. In this article we are going to talk about the basic concept of logic, essentially we'll look at TRUE and FALSE.

These states are represented by computers as two different numbers and on the CPC they happen to be –1 for TRUE and 0 for FALSE. The actual numbers are not very important. What *is* important is whether the result of an expression is true or not.

Regular readers of Basic Tutor will have seen me often use this line in my example programs:

```
10 TRUE=(1=1): FALSE=(NOT TRUE)
```

What it says is: The variable TRUE becomes equal to the statement 1=1. Now as intelligent human beings we know that the number 1 does indeed equal the number 1. They are the same. It is a true statement. Therefore the variable TRUE will be set to whatever value the computer chooses to represent a true statement with (in our case –1).

The bit after the colon – which looks suspiciously like plain English – simply translates to, the variable FALSE becomes equal to NOT TRUE. So, the variable FALSE is set to whatever value the computer chooses to represent as being NOT TRUE.

Let's not get too heavy here by going into how NOT works – we'll look at that later – the important thing is that we've set up two Boolean constants, which were named after George Boole, the man who first invented them.

Boole also invented the Boolean expression. Don't panic, it's nothing more than what you regularly see in an IF...THEN...ELSE statement. Figure I shows how it works

Let's take a closer look at that Boolean expression. What the computer has to work out is, does answer$ equal the letter Y. Yes? No!

What you see is the accepted shorthand way of writing: IF (answer$="Y")=TRUE ... So what the computer has to work out is whether the result of the Boolean expression (answer$="Y") evaluates to the number the computer considers to be 'true'. Look, try this:

```
10 MODE 1
20 TRUE=(1=1): FALSE=(NOT TRUE)
30 PRINT"Enter a letter ";
40 INPUT answer$:PRINT
50 answer$=UPPER$(answer$)
60 x=(answer$="Y")
70 IF (x=TRUE)=TRUE THEN PRINT"TRUE"
80 IF (x=FALSE)=TRUE THEN PRINT"FALSE"
```

Line 60 evaluates the Boolean expression and assigns the result of it to the variable x. Lines 70 and 80 then investigate x to see whether it is set

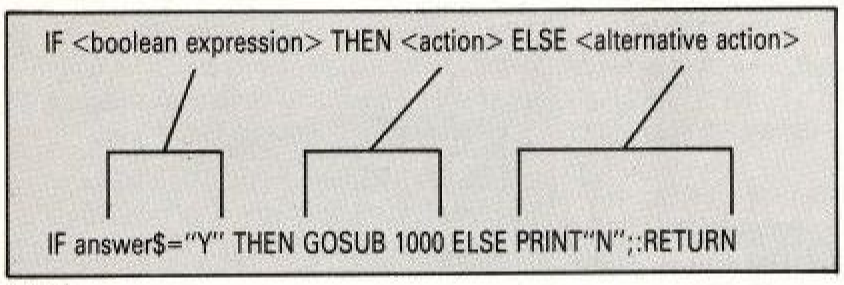


Figure I

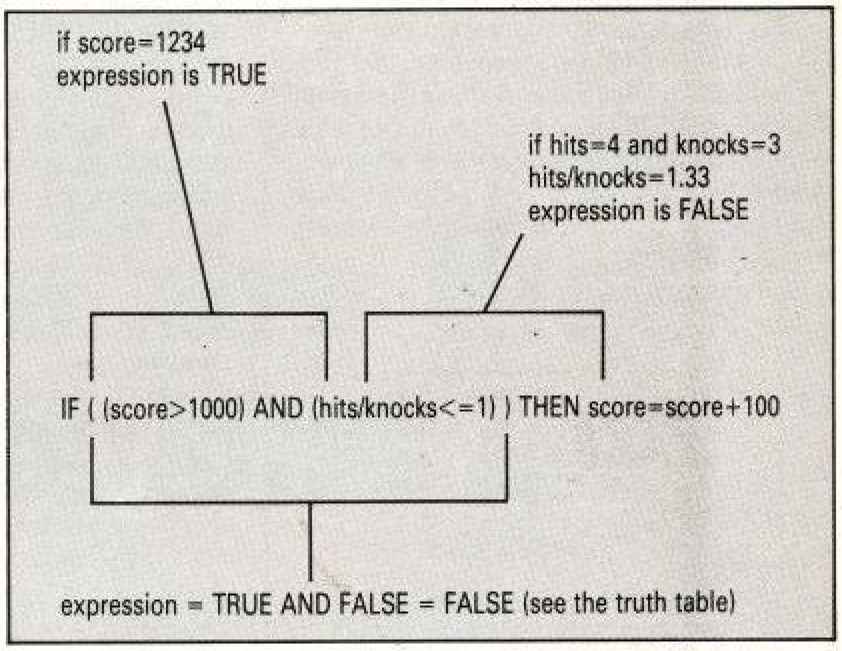


Figure II

to the computer's idea of true or false. If you enter Y the printout will be TRUE, any other letter and the printout will be FALSE.

An important feature of Boolean expressions is the bracket. Mostly it is optional, except when you want to force a certain expression to be evaluated before another in a multiple expression. However, even in short, simple Boolean expressions, brackets can make the program much more readable. Spaces can be used to good effect too. For example:

TRUE=1=1 is acceptable Basic, but the two equals signs are confusing and the expression means less than nothing to a novice programmer, whereas:

TRUE=(1=1) is better. But:

TRUE = (1=1)

makes the programmer's intentions quite clear.

If you get into the habit of always enclosing Boolean expressions between brackets, and use spaces where necessary, then with intelligent variable names your programs will be that much easier to debug.

Yes, I know it's more typing, and I know your programs will take longer to load, and I know they'll run slower, but you'll thank me for it later.

As we've seen in the FALSE=(NOT TRUE) statement, Boolean logic has its own operators, NOT being one of them. Boole had two others, AND and OR. (Later some enterprising egghead added XOR.)

How they work is really quite simple, although remembering what operator does what is difficult for beginners. That is why the truth table was invented.

TRUE AND TRUE = TRUE
TRUE AND FALSE = FALSE
FALSE AND TRUE = FALSE
FALSE AND FALSE = FALSE

TRUE OR TRUE = TRUE
TRUE OR FALSE = TRUE
FALSE OR TRUE = TRUE
FALSE OR FALSE = FALSE

NOT TRUE = FALSE
NOT FALSE = TRUE

A truth table

Armed with this table, we can assign some dummy values to some variables and evaluate a longish Boolean expression:

In Figure II, with the variables set at score =1234, hits=4 and knocks=3, the whole Boolean expression evaluates as FALSE, so the statement after the THEN will not execute. As an exercise, change the variables to score=1234, hits=4, knocks=5 and evaluate the expression again. It should come out as TRUE.

Any large multiple Boolean expression can be broken down into what I call a "truth tree" and evaluated by replacing the variables with dummy values. Remember, the whole expression is the bit between IF and THEN. Evaluate the innermost terms first, and work your way out. (A "term" is a single Boolean expression like hits/knocks<=1, a>10, b=6). One more example is shown in Figure III

In it, the brackets are very important. If we leave the expressions and the dummy values the same, but change the brackets around, as in Figure IV, although the whole expression is still TRUE, you can see that the structure of the truth tree has changed and the bottom level expression has become FALSE OR TRUE, whereas before it was TRUE OR TRUE. Lesson: if your logic isn't working, check your brackets first.

Closely associated with logic is the technique

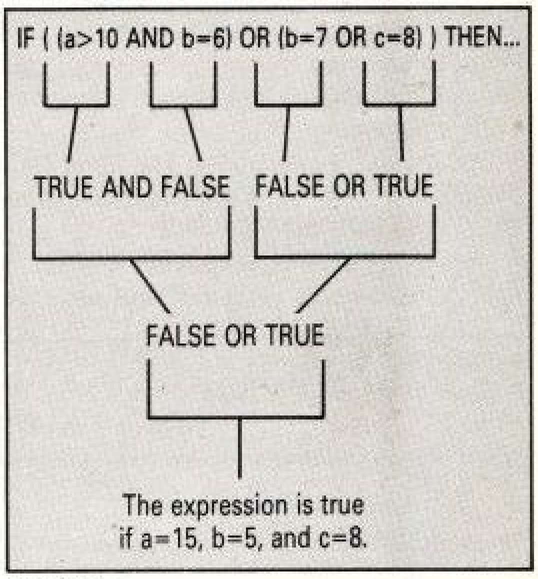


Figure IV

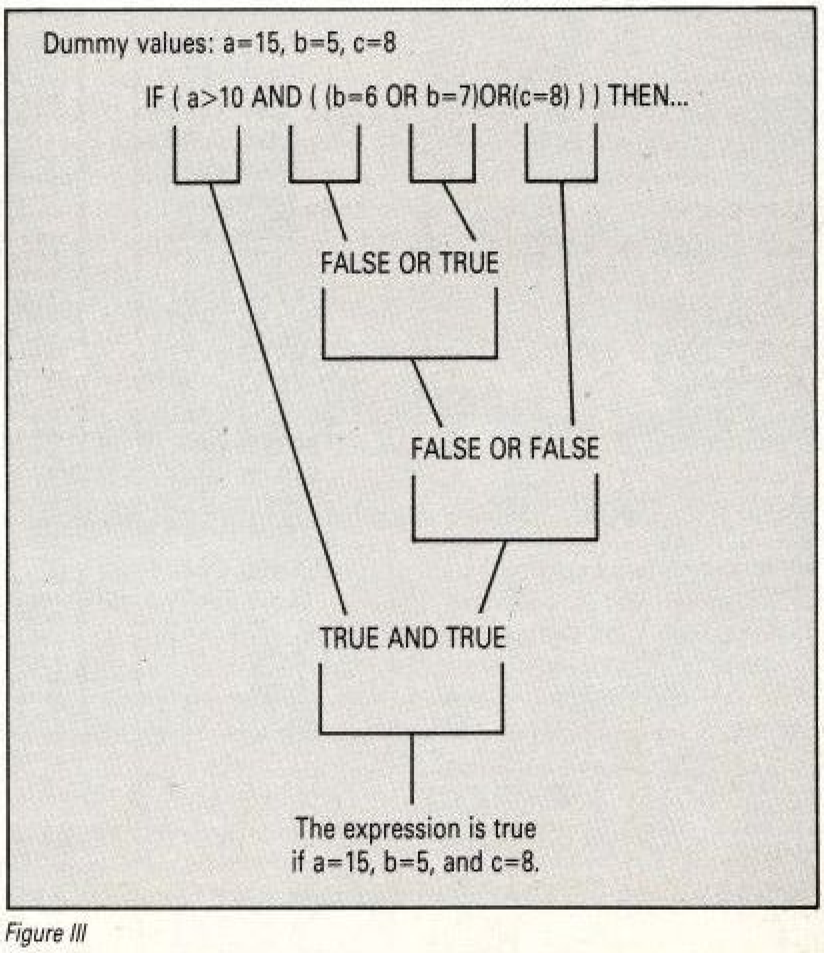


Figure III

of using flags in your programs.

Flags are easy to explain. Just imagine you've got lots of little men inside your computer. Each man is holding a flag on a stick (like a linesman in football or rugby), and each man has only one job – to check, each time you ask him, whether a certain thing has happened yet. If it has, he raises his flag to let you know, otherwise he keeps his flag by his side.

You've seen me use this technique in previous articles:

```
10 TRUE=(1=1): FALSE=(NOT TRUE)
20 BORED=FALSE
30 WHILE NOT BORED
40 :
50 :
60 IF ... THEN BORED=TRUE
70 WEND
```

The variable BORED is being used as a flag to let the program know when to exit the WHILE..WEND loop. Although it has a different name, it too will only carry one of two values, TRUE or FALSE.

The Boolean expression in line 30 is (NOT BORED), but remember that the longhand of line 30 is WHILE (NOT BORED)=TRUE.

If we evaluate the expression by replacing the flag, BORED, with its TRUE or FALSE status (set up in line 20 as FALSE) we can see from the truth table that NOT FALSE = TRUE. So at the start of the loop, line 30 is translated by Arnold to read WHILE TRUE=TRUE, which it does. The loop executes until something happens (in line 60) to set BORED equal to TRUE.

One of our little men has raised his flag, and when this happens line 30 becomes WHILE FALSE=TRUE because BORED is now equal to TRUE, and NOT TRUE = FALSE. Therefore, as FALSE doesn't equal TRUE, the loop stops executing.

Flags are marvellous tools for making Basic programs more readable and easier to debug. A useful thing to be able to do with a flag is toggle it between TRUE and FALSE. You may remember me using this technique a couple of months back in the article on interrupts. The way to do it is simply:

FLAG=(NOT FLAG) acts just like an on/off switch. How? Well, if you replace the variable in the Boolean expression (the bit between the brackets) with its true or false status – let's say it's FALSE at the moment – then the expression evaluates to FLAG=(NOT FALSE) and we know from the truth table that NOT FALSE = TRUE, so the variable FLAG is changed from FALSE to TRUE. The opposite would have happened if the value of FLAG was originally TRUE. Try it if you don't believe me.

I'm going to finish this article on logic by introducing you to some laws of logic that can help you considerably reduce the length of unwieldy or confusing Boolean expressions. The first are known as the distributive laws:

(a OR c) AND (b OR c) = (a AND b) OR c
(a AND c) OR (b AND c) = (a OR b) AND c

The idea here is that the bit on the right hand side of the equation is a shorter and neater way of writing the bit on the left hand side.

Give the variables a,b,c dummy values and check that both sides of the equation evaluate to the same true or false state, so that the expressions evaluate to TRUE=TRUE or FALSE=FALSE.

The next set of logic laws are known as De Morgan's laws:

(NOT a) AND (NOT b) = NOT (a OR b)
(NOT a) OR (NOT b) = NOT (a AND b)

Again, don't take my word for it – evaluate these expressions to check that they really do work.

Boolean expressions may seem hard to evaluate at first, but by looking at one term at a time I hope I have shown you how to bring even the longest expressions into perspective. Tarra. (Who's pinched the aspirin?).



The xtra that shouldn't be

Romantic Robot's disc helps you master RODOS. Jeff Walker discovers what you'll have to pay more for

WHAT can I say? This disc contains over 200k of the sort of stuff that should have been distributed with the RODOS rom in the first place. 40k of this disc, would you believe, is taken up by the RODOS manual itself – yes, the same one you got with the rom – printer control codes and all.

The rest of the disc is mainly Help files, one for each RSX in the RODOS rom, plus a couple of general Help files, including one about how the tree directory system works.

To complement these Help files there are a few Basic programs to further demonstrate how some of the RODOS and RECS commands work. They are mainly short, simple programs that do very little more than show you how to utilise a single command. All except one, that is – a RODOS disc sector editor written in Basic with RSXs – which, although slow and cumbersome, is perhaps worth having because normal disc sector editors will not handle the RODOS format.

These Basic programs, some of which are not even of type-in quality, are as such unreviewable. However, I feel you must look on them as "give away" programs and not judge them too harshly. Unfortunately though, RODOS XTRA is not being given away, so we must look further than these Basic programs to see what we are getting for our money.

Plainly, what we are getting is an extended RODOS manual on disc. And these Help files do indeed go into further detail about how to use each RSX to its fullest. But although the explanations are detailed, can estimate an opinion about how much care has been taken over compiling them by noting the number of elementary spelling mistakes and grammatical errors in the texts.

The size and complexity of the Help files, I believe, is tantamount to an admission that the manual being distributed with RODOS is totally inadequate. Because of this, RODOS XTRA will be an invaluable aid to you. It will show you just what this operating system is capable of. It will also put the cost of the RODOS rom plus an effective manual up to almost £40.

The following is an example of the sort of extra information this disc contains. It was gleaned from the file named READSECT, and is just a snippet from it: [sic]

&81 to &8A – RODOS type format (side one)
&18B to &194 – RODOS type format (side two)

RODOS disc have about 40 or 80 tracks (usually 1 or 2 more if formatted with parameters as given by the "max format" program on this demo disc.)

If reading a 40 track disc in an 80 track drive, I OPT,13,255 will enable double stepping I OPT,13,0 will disable double stepping so to read track 23 on drive 1, (40 track disc in 80 track drive) sector &03 on side two, to memory address &8000

```
I OPT,13,255
I READSECT,&8000,1,23,&103
I OPT,13,0
```

Compare this with the miniscule amount of information the RODOS manual gives you on the same command, and you will be able to judge for yourselves whether RODOS XTRA is a wise investment or not. I don't see how Joe Average can use the RODOS operating system properly without it. Sad, but true.

RODOS XTRA
(for use with RODOS v2.11 and higher)
£9.88 disc
Romantic Robot, 15 Hayland Close, London NW9 0LH. Tel 01-200 8870

GOTHIK

Nigel

A game where the scenario doesn't make much sense. If the good wizard didn't manage to defeat the bad one before he got hacked to pieces, then how on Earth is he going to manage it once you have resurrected him?

Having said that, this is my sort of game. No zapping of aliens, plenty of puzzles to sort out and no time limit. The graphics are good and everything moves along at the pace you dictate.

16/20

Liz

There is plenty to see and do. The meanies aren't too difficult to avoid, although they do gang up on you at times. Choice of weapon can be very important, and ammunition tends to run out very quickly if you are trigger happy.

The separate status report screen, from where you choose weapons and eyeball scores and levels of life, is a nice idea, freeing the whole screen for the game itself.

A smooth game; easy to play, but difficult (I would imagine) to complete.

16/20

Colin

Yawn. About the most exciting thing that happened to me in Gothik was when I gargled with some bionic mouthwash and ended up rushing around like a wind in a bean can (I bet the Ed cleans that one up).

In one form or another this plot has been done before, and no doubt it'll be done again. I guess that means it's popular. Not with me it isn't.

Yawn.

10/20

BE warned, folks. Gothik is a game designed to take up hours and hours of your daily schedule. It's a game of strategy, mapping, zapping, scrapping and handicapping.

The plot sounds vaguely familiar: Once upon a time ... far distant land ... good wizard living among the people ... everything hunky-dory ... bad wizard turns up with his army ... generally obnoxious ... defeats the good wizard ... cuts him up into six chunks ... ginormous castle .. secret chambers ...

The object is to explore the four castle towers level by level, and in the process collect up the six parts of the good wizard. Stick him back together and you have won the game.

Ah. I forgot to tell you about all the evil little creatures that wander around trying to kill you. These natives are not friendly, fortunately for you neither are they immortal.

The good news is that you have a few weapons about your person to aid their despatch to that great baddy-bin in the sky. The bad news is that you don't have a limitless supply.

You have three types of weapon to choose from – arrows, lightning bolts and fireballs – which can be swapped around from a status report screen.

Around the corridors, which are viewed from above, you come across sundry objects and magic potion bottles. The objects replenish your armoury and the potions can help or hinder you with some hoopy magic spell.

To further hinder your progress brambles grow all around, blocking the corridors, and you have to clear them away.

You can teleport from one tower to another on the same level by entering a portal. One tower usually has an extra portal taking you to one of the secret chambers holding a bit of the good wiz.

Once you enter the portal you are whisked off to a constricted little maze where you have to outrun the forces of darkness creeping up behind you.

Once you reach the end you have to blow up a giant green dragon which guards the sixth-of-the-wiz, then it's on to the next level.

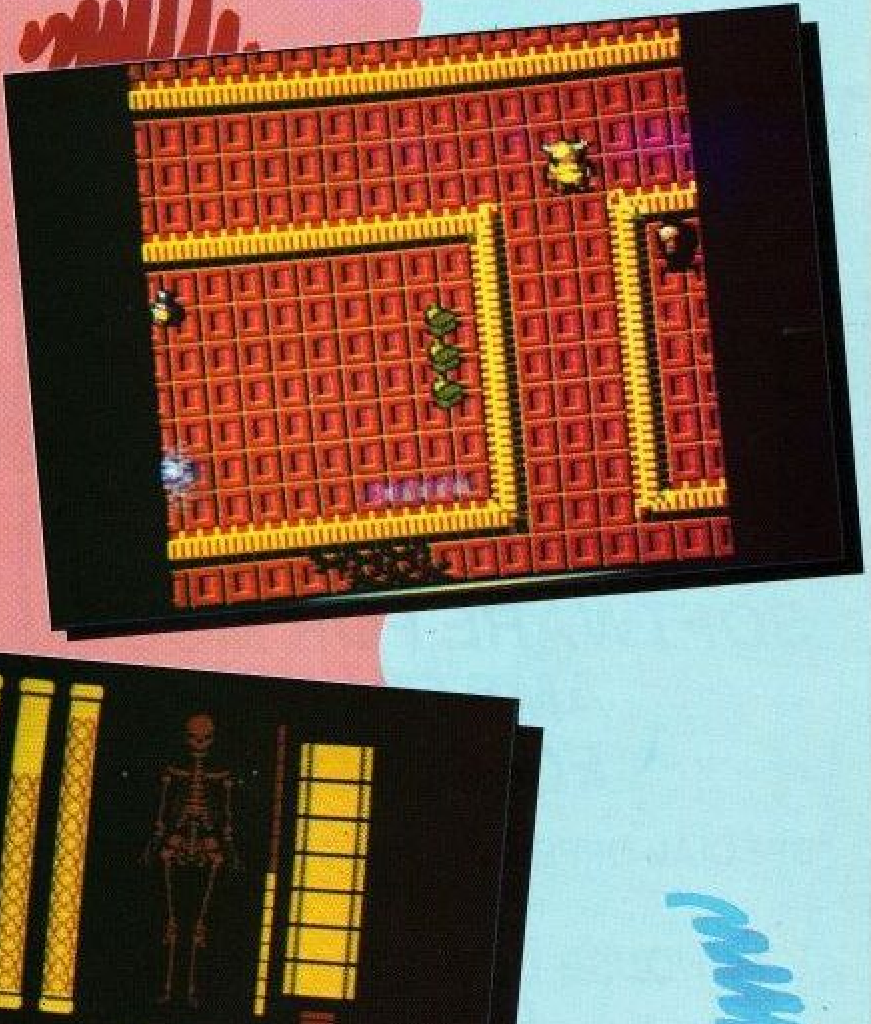
The two types of marauding baddies on the first level look like gorillas and little blue Smarties. Once you've zapped 'em they end up looking like swirling red cowpats.

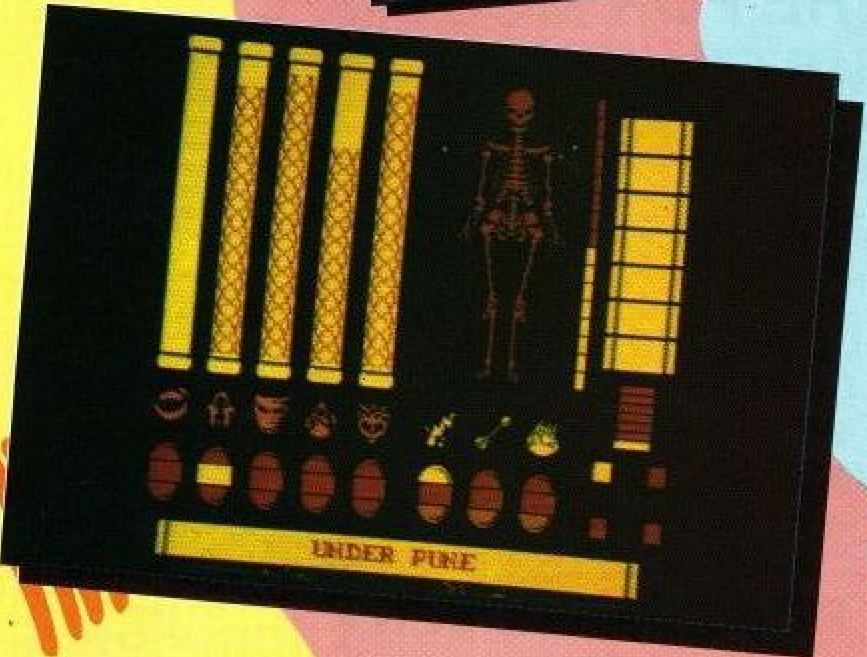
On the second level the baddies look like blue hedgehogs, and they're pretty hard to see because the playing area turns a speckly blue as well.

The graphics are good and the characters are really cute, even more so when they drink a potion which gives them double speed. Their little legs start going up and down like bats' wings.

It's a shame there is no save game facility with Gothik, because you can literally be playing it for hours. Minor niggles aside, this is an absorbing game with a great deal of humour and a lot of depth to it.

Author: Firebird
Price: £8.95 cassette, £14.95 disc







REVENGE OF DOH

THE original Arkanoid was a great success, and was certainly one of my favourite games. Now we have a sequel.

Revenge of Doh is really a version of Breakout, however, has an incredible number of extra features.

The bat has been transformed into a spaceship called Vaus, and the ball into an energy bolt. You can make the bolt fly off Vaus at different angles, depending on where the ball bounces on it.

The bricks have all sorts of different properties, depending on their colour and design.

Some need to be hit several times before they are destroyed; others disappear and reappear at the most awkward moments; yet others, on being hit, uncover canisters which fall and which you can pick up by letting them hit Vaus.

The canisters bear various letters, signifying different effects which take place when you catch them.

There are also aliens which move around randomly. They are usually hemmed in by bricks, and are only freed when the bricks are destroyed.

They can't kill you, but they are a nuisance as they can deflect the energy bolt away from Vaus. You can get rid of them by hitting them with Vaus or shooting them with the laser (if you have it), but more keep coming all the time.

Wonderful stuff – the controls are easy to master (just Left, Right and Fire using keyboard or joystick), and the game is horribly addictive. It'll keep you up to the small hours. No problems with a green screen.

Author: Imagine/Ocean
Price: £9.95 tape, £14.95 disc

Nigel

A terrific game. The graphics are extremely colourful, as are the screen backgrounds, just like the original Arkanoid.

Revenge of Doh is much tougher – I could dash through the first three levels of the original in a few minutes, whereas this takes much longer and has a lot of twists and turns.

It's faster too, and there are far more canisters waiting to be picked up.

20/20

Liz

If you thought Breakout was an old, clapped-out idea, you will be very surprised when you see Revenge of Doh. The graphics are colourful and flicker-free, and Vaus is easy to control, which is good news for butter-fingers like me.

One word of caution, if you clear a few screens there will be pauses as the later screens are loaded from tape during the game.

18/20

Colin

Lovely loading screen, very colourful title screen (with some clever colour effects), a good high score table, and a great game. Revenge of Doh shows you that the simplest game plots are often the best.

The only slight quibble is with the sound – the tunes are noisy rather than melodious, and the only sound during the game is a strange echo effect when you hit a brick.

18/20

L.A. SWAT

"SPECIAL assignment! Rescue the hostages from the terrorist gangs ... Blow away the bad guys ... All action joystick bending combat for those with the skill to survive".

I've never been keen on your run-of-the-mill, two dimensional, head-'em-up, move-'em-out and shoot-'em-up type of games.

They all, of necessity, follow the same well tried formula – good guy meets hundreds of bad guys, good guy shoots hundreds of bad guys, civilisation as we know it is saved – and rarely provides enough variation to hold my attention for long.

Once you've wasted a couple of dozen grenade-throwing terrorists, you've wasted them all.

However, it would take a stronger willpower than mine to resist the temptation of a bent joystick and, after blurb like that, there was always the possibility that L.A. SWAT from Mastertronic would be the game to make me revise my opinions. Sadly, it wasn't.

L.A.SWAT is set in 1999. A terrorist group has taken over the west side of L.A. As the leader of a crack SWAT squad, your assignment is to clear the streets and rescue the hostages being held by the gang.

For those of you who have managed to miss some of the finer dramatic productions of American network TV, a SWAT squad is a highly trained, ruthlessly efficient group of men dedicated to making the world a safer place for Mom, apple pie and the American way.

SWAT stands for Special Weapons And Tactics – although in this case Sleep Walking And Tedious is more like it.

In order to rescue the hostages you have to steer your squad of three through the streets, defending yourselves against attack, until you reach the junctions where they are being held.

The team leader is an unpopular guy. The terrorists pick on him to the exclusion of all others; snipers use him for target practice, grenades shower around him, and club-wielding thugs pursue him relentlessly. Once he gets taken out another team member takes over.

Points are scored as the squad progresses along the street from junction to junction, weaving between the overturned cars and picking off terrorists as they go.

This is complicated by the fact that there are still a few civilians within the area. Dropping Joe Public is not considered to be good form in SWAT circles and will cost you points, so it pays to be selective about where you point the business end of your gun.

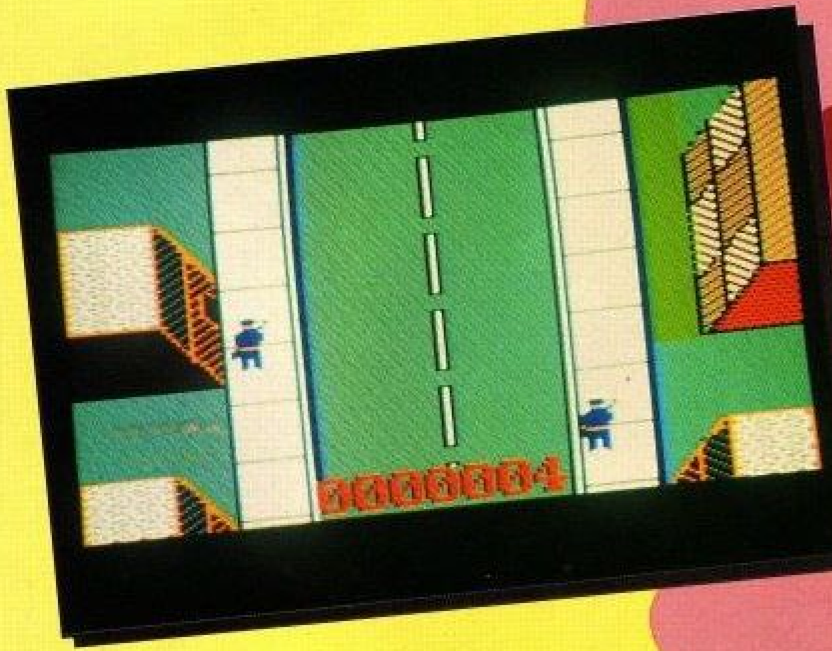
Sounds pretty good doesn't it? Plenty of action and a good setting; L.A.'s an exciting kind of place. Well so it is.

Unfortunately L.A., Mastertronic style, bears more than a passing resemblance to Milton Keynes on a wet Sunday, while the SWAT squad moves with all the speed and agility of Clive Dunn on Valium.

Eventually, if you are still awake, the squad reaches the junction where the hostages are being held. Finish off the terrorists, bring out the undamaged hostages, and yet another successful mission is in the bag.

Somewhere out there I believe there is a novel and exciting shoot-'em-up game just waiting to be invented. I'm afraid that L.A. SWAT isn't it.

Speeded up and with a bit more variety, it could become a reasonable game, although never a world beater. In its current form however, it leaves a lot to be desired.



Author: Entertainment USA
Price: £1.99

Nigel

SWAT stands for Special Weapons And Tactics. The weapon is a rifle that can't shoot further than halfway across the street, and the tactics are shoot everything that moves and hope it's not a passer-by.

Nothing special about that, and there's nothing special about L.A. SWAT. The slow responses and bad collision detection soon become tedious – not frustrating, merely tedious. Entertainment USA? Never.

5/20

Colin

The "squad" is actually three guys, only one of which – the leader – can shoot or be shot. Once he's bitten the tarmac, one of the remaining two takes over as leader while the other one toddles up the other side of the road as if he's out for a Sunday afternoon stroll.

This game is slow to get into and never really speeds up. Total absence of sound may be OK for games that score high on playability, but not even good sound effects could rescue L.A. SWAT.

7/20

Liz

There's a problem with this game. Shooting a pedestrian costs you 100 points. If you happen to shoot one before you've actually scored 100 points, then you go below zero and the game crashes, forcing you to re-load if you want to play again.

I did re-load once, and managed to wipe out a few of the gang and advance a few yards, but my enthusiasm disappeared very quickly when I shot two more pedestrians by mistake and the screen froze again.

6/20

CYBERNOID

YOU play the part of the Cybernoid, a cute little robot that looks a bit like a metallic Andy Capp. His mission seems to be to clear out various bugs that have infested a very large machine housed in a huge complex of underground caverns.

To aid you in this messy task you have been blessed with a variety of weapons, including missiles, seeker missiles, bombs, bouncing bombs and mines.

On your journey through the machine you have to traverse various rooms. In each one there is a different type of bug with hostile intentions.

Sometimes when you zap them they transmute. If you then pick up these new shapes they can turn out to be additional weapons, energy, time or points.

Most screens have some type of problem to solve, so it's not just a question of zapping away at the fire button. You may have to pass unscathed through some machinery, or duck and dive past missiles being hurled at you by an indestructible enemy placement.

The graphics are very good, with a lot of attention paid to detail.

I got the impression I was in some kind of Victorian steam driven contraption. Little volcanoes (volcanettes?) bubble away spewing forth rocks and stuff, and pistons pump up and down all over the place.

The animation is very smooth and very fast, except when you get a bouncing bomb, several sprites, volcanic flotsam and a few dozen killer blobs all bouncing around the screen at the same time.

This does slow the movement down quite a bit. Fortunately it doesn't occur very often.

The game has a high score table – something I like to see – and the keys can be defined, should you wish mercilessly to batter your keyboard to death. I tried playing this game via the keyboard for a while ... it's difficult.

A sound on/off option has been included. This is fine if you dislike computer muzak, but really mucks up one aspect of the game concerning shields. When the shield is activated a little tweeting noise alerts you to the fact it is in operation.

Sometimes this is muchos useful because the action on the screen doesn't give you a chance to check out the status board. With no sound you have no way of easily telling if the shield has been activated.

No, not just another shoot 'em up, Cybernoid is a different kettle of fish. (Why do people keep fish in kettles?)

Author: Raffaele Cecco for Hewson
Price: £9.99 cassette, £14.95 disc





Nigel

I enjoyed Cybernoid, but there's not an awful lot about the game that makes it different from any other of this type: Clear the room of meanies, pick up any extra lives/ammunition, get over an obstacle, then toddle off to the next room.

With smooth, fast, colourful animation, Cybernoid scores high on graphics, but the plot lacks an incentive other than the wish to see what the next cavern looks like.

This game starts in a volcanic eruption of colour and never looks back, but I guess it has to go down in the record books as just another shoot 'em up.

13/20

Colin

Cybernoid is my pick of the shoot 'em ups this month. Every time I play I seem to find out something new about it, and that's a sign of a game with depth.

You've got to be quick, too. At first I got the impression I had all the time in the world, but there's a weevil eating away at a wedge of time at the top right of the screen. When the wedge runs out, so does your luck.

I could spend hours playing this game, and I probably will.

15/20

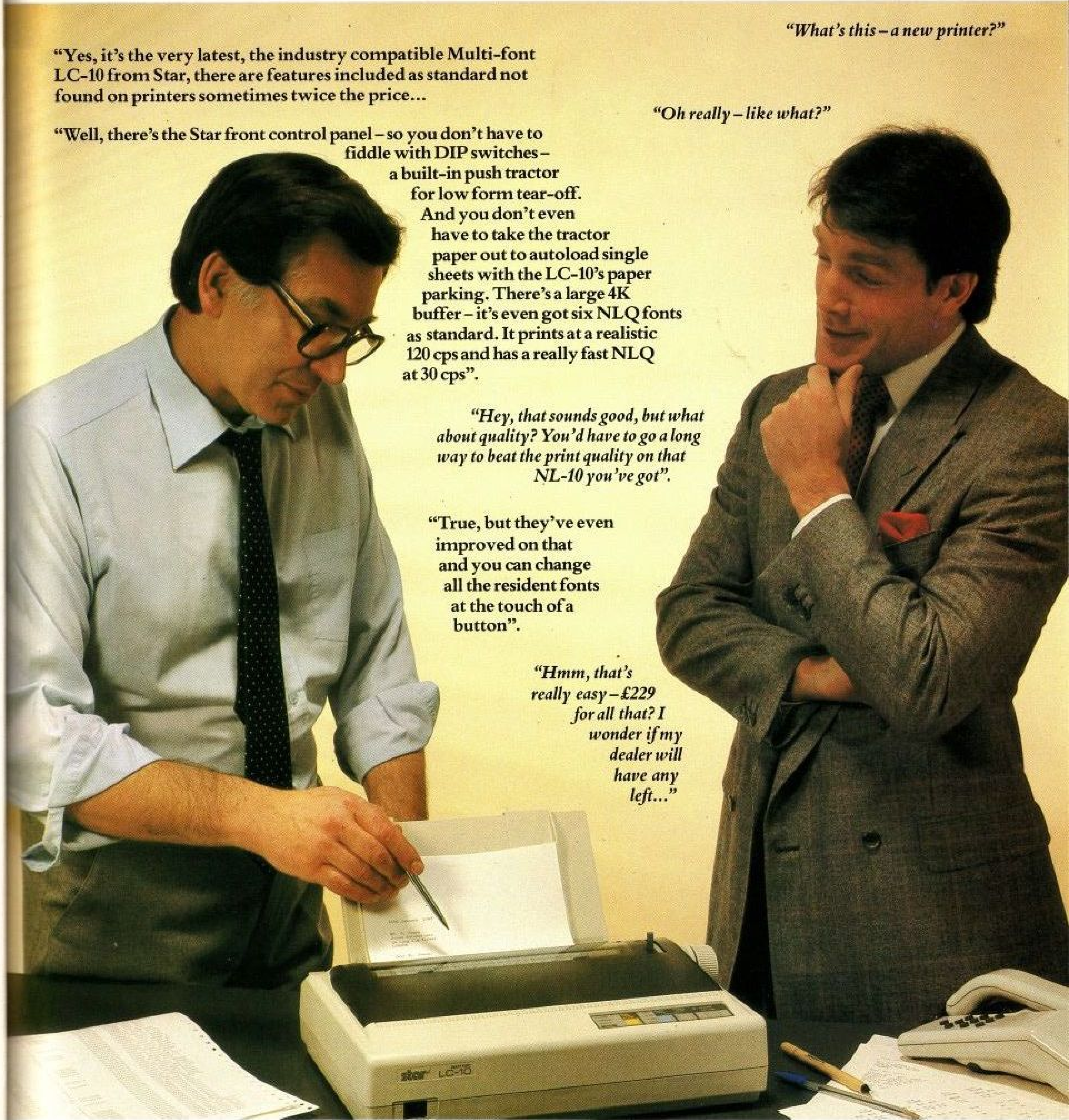
Liz

The fiery mace that swings around the cybernoid's head, following it through hell and high water no matter where it goes, is a brilliant piece of animation. In fact, just about every sprite, including the blobs, has been polished till it shines.

The plot may lack a little imagination, and the gameplay may be a trifle monotonous, but Cybernoid is worth playing simply for the satisfaction of seeing how good an arcade game can look on a CPC colour monitor.

5/20

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Screen shots from Atari ST version

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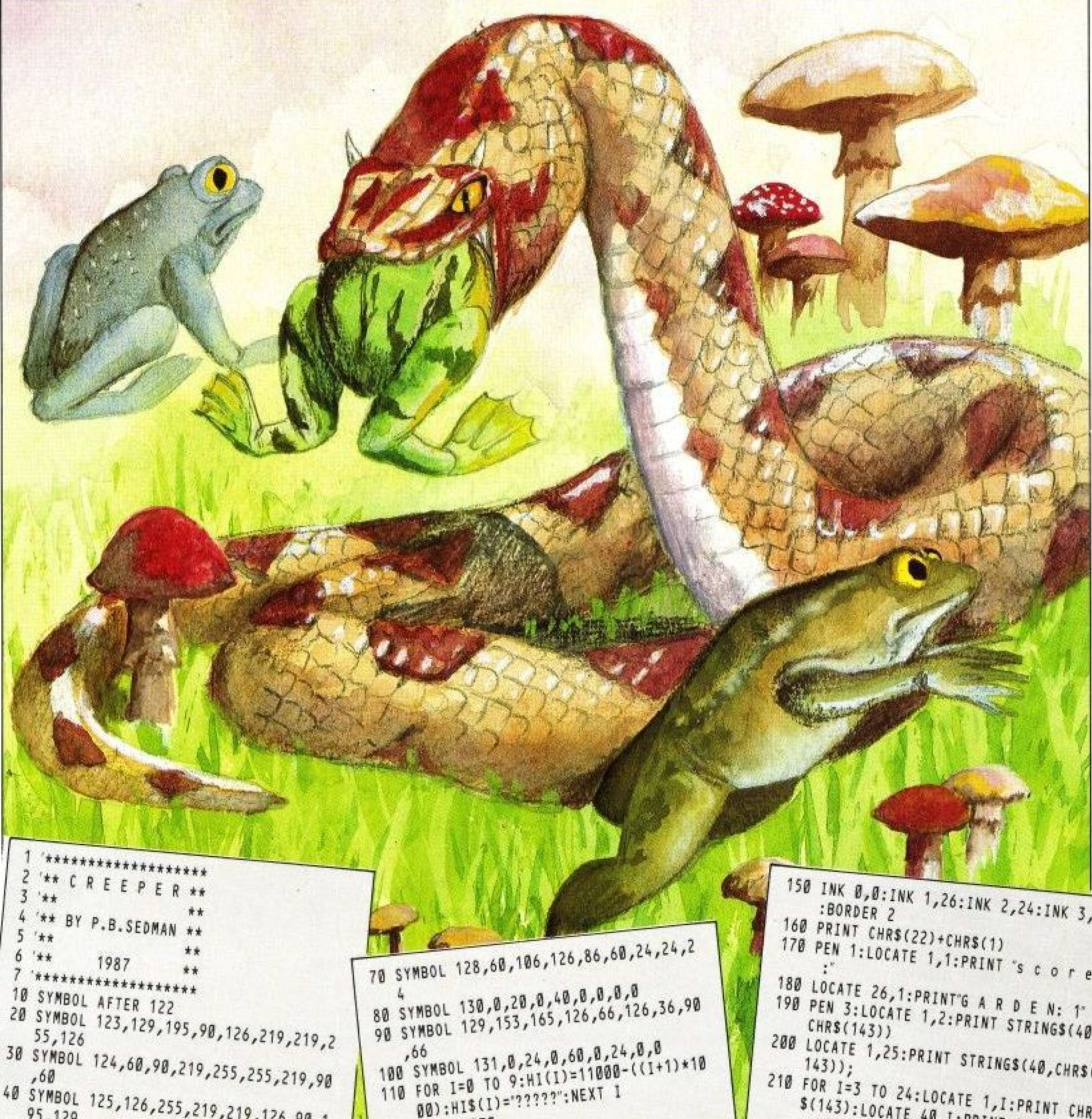
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CREEPER

Try this game in Basic by P.B. Sedman

DOWN in the garden, where the poisonous mushrooms grow, live the fattest, juiciest grubs of all. So fat are they that their little legs have presented you, the hungry caterpillar, with a feast not to be missed. The more you eat, the longer and stronger you get, and the longer and stronger you get, the faster you can snap up the grubs.

Clear the garden of grubs to get a yourself a bonus and another chance of a feast. But beware – bite yourself or a deadly mushroom and the worm will turn.



```
1 '********************
2 '** C R E E P E R **
3 '**               **
4 '** BY P.B.SEDMAN **
5 '**               **
6 '**     1987      **
7 '********************
10 SYMBOL AFTER 122
20 SYMBOL 123,129,195,90,126,219,219,2
   55,126
30 SYMBOL 124,60,90,219,255,255,219,90
   ,60
40 SYMBOL 125,126,255,219,219,126,90,1
   95,129
50 SYMBOL 126,115,254,200,252,252,200,
   254,115
60 SYMBOL 127,206,127,19,63,63,19,127,
   206
```

```
70 SYMBOL 128,60,106,126,86,60,24,24,2
   4
80 SYMBOL 130,0,20,0,40,0,0,0,0
90 SYMBOL 129,153,165,126,66,126,36,90
   ,66
100 SYMBOL 131,0,24,0,60,0,24,0,0
110 FOR I=0 TO 9:HI(I)=11000-((I+1)*10
    00):HI$(I)="?????":NEXT I
120 GOTO 1270
130 MODE 1
140 DIM MA$(39,24),SX(100),SY(100),DSX
    (100),DSY(100)
```

```
150 INK 0,0:INK 1,26:INK 2,24:INK 3,10
    :BORDER 2
160 PRINT CHR$(22)+CHR$(1)
170 PEN 1:LOCATE 1,1:PRINT "s c o r e
    :"
180 LOCATE 26,1:PRINT"G A R D E N: 1"
190 PEN 3:LOCATE 1,2:PRINT STRING$(40,
    CHR$(143))
200 LOCATE 1,25:PRINT STRING$(40,CHR$(
    143));
210 FOR I=3 TO 24:LOCATE 1,I:PRINT CHR
    $(143):LOCATE 40,I:PRINT CHR$(143)
    ;:NEXT I
220 PEN 2:LOCATE 1,2:PRINT STRING$(40,
    CHR$(233))
230 LOCATE 1,25:PRINT STRING$(40,CHR$(
    233));
```

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240 FOR I=3 TO 24:LOCATE 1,I:PRINT CHR
    $(233):LOCATE 40,I:PRINT CHR$(233)
    ;:NEXT I
250 PRINT CHR$(22)+CHR$(0)
260 t$=CHR$(124):h$=CHR$(123):s$=CHR$(
    32):m$=CHR$(128):b$=CHR$(129)
270 DX=0:DY=-1:TL=1:TI=150:LE=10:SO=50
    :NO=0:PB=0:DSX=0:DSY=-1:SX=20:SY=1
    4:LEV=1
280 X=20:Y=12:SP=0.2:SC=0:nl=0
290 FOR I=0 TO TL:LX(I)=20:LY(I)=12+I:
    NEXT I
300 PEN 2
310 LOCATE X,Y:MA$(X,Y)=H$:PRINT H$:PE
    N 3:FOR I=Y+1 TO Y+TL:LOCATE X,I:M
    A$(X,I)=T$:PRINT T$:NEXT I
320 GOSUB 620
330 LOCATE x,y:ma$(x,y)="":FOR i=y+1 T
    O y+tl:ma$(x,i)="":NEXT i
340 K$=UPPER$(INKEY$):IF K$="" THEN 34
    0
350 IF K$<>"A" AND K$<>"D" AND K$<>"I"
     AND K$<> "K" THEN 340
360 GOTO 400
370 FOR Z=0 TO TI STEP SP
380 NEXT z
390 K$=UPPER$(INKEY$)
400 IF K$="A" THEN DX=-1:DY=0:h$=CHR$(
    127):GOTO 1040
410 IF K$="D" THEN DX=1:DY=0:h$=CHR$(1
    26):GOTO 1040
420 IF K$="I" THEN DX=0:DY=-1:h$=CHR$(
    123):GOTO 1040
430 IF K$="K" THEN DX=0:DY=1:h$=CHR$(1
    25):GOTO 1040
440 X=X+DX:Y=Y+DY
450 px=(x*16)-6:py=408-(y*16)
460 IF X>39 OR X<2 OR Y>24 OR Y<3 THEN
     860
470 IF TEST(px,py)>0 AND ma$(x,y)="" T
    HEN 870
480 IF MA$(X,Y)=B$ THEN 890
490 IF MA$(X,Y)=M$ THEN 880
500 LX(1)=LX(0):LY(1)=LY(0)
510 LX(0)=X:LY(0)=Y
520 PEN 2
530 LOCATE X,Y:PRINT H$
540 PEN 3
550 LOCATE LX(1),LY(1):PRINT T$
560 SX=SX+DSX:SY=SY+DSY
570 IF SX=SX(NO) AND SY=SY(NO) THEN DS
    X=DSX(NO):DSY=DSY(NO):SX(NO)=0:NO=
    NO+1
580 IF NO>60 THEN NO=0
590 LOCATE SX,SY:PRINT S$
600 SOUND 1,300,5
610 GOTO 370
620 PRINT CHR$(22)+CHR$(1)
630 FOR I=1 TO LE+3
640 X=INT(RND*38)+2
650 Y=INT(RND*22)+3
660 IF MA$(X,Y)<>"" THEN 640
670 px=(x*16)-6:py=408-(y*16)
680 IF TEST(px,py)>0 THEN 640
690 LOCATE X,Y:PEN 3:PRINT M$:PEN 2:LO
    CATE X,Y:PRINT CHR$(130)
700 MA$(X,Y)=M$
710 SOUND 1,RND*300,3,7,0,0,15
720 NEXT I
730 PEN 3
740 FOR I=0 TO 100:NEXT I
750 FOR I=1 TO (LE+5)
760 X=INT(RND*38)+2
770 Y=INT(RND*22)+3
780 IF MA$(X,Y)<>"" THEN 760
790 px=(x*16)-6:py=408-(y*16):IF TEST(
    px,py)>0 THEN 760
800 LOCATE X,Y:PEN 2:PRINT B$:PEN 3:LO
    CATE X,Y:PRINT CHR$(131)
810 MA$(X,Y)=B$
820 SOUND 1,RND*300,3
830 NEXT I
840 X=20:Y=12:PRINT CHR$(22)+CHR$(0)
850 RETURN
860 ME$=" YOU HIT THE GARDEN         FEN
    CE.":GOTO 1860
870 ME$=" YOU BIT YOUR TAIL.":GOTO 186
    0
880 ME$="  YOU ATE A DEADLY         MUSH
    ROOM.":GOTO 1860
890 FOR I=33 TO 57
900 SC=SC+2:LOCATE 13,1:PRINT SC;
910 SO=SO+10
920 nl=nl+1:IF nl=375 THEN nl=0:LOCATE
     x,y:PRINT CHR$(32):GOTO 1090
930 LOCATE X,Y:PRINT CHR$(I);
940 SOUND 1,SO,2:SOUND 2,SO+7,2:NEXT I
950 LOCATE X,Y:PRINT CHR$(32):MA$(X,Y)
    =""
960 SX=SX-DSX:SY=SY-DSY:SP=SP+0.025
970 SO=50
980 GOTO 500
990 FOR I=0 TO 200
1000 SOUND 1,300,1,7,0,0,15
1010 NEXT I
1020 FOR I=15 TO 0 STEP -0.2:SOUND 1,3
    00,1,7,0,0,I:NEXT I
1030 RETURN
1040 SX(PB)=X:SY(PB)=Y:DSX(PB)=DX:DSY(
    PB)=DY:PB=PB+1
1050 IF PB>60 THEN PB=0
1060 GOTO 440
1070 nl=0:le=le+5:GOSUB 620
1080 GOTO 340
1090 ENV 1,100,3,1
1100 FOR i=0 TO 200:NEXT i
1110 bonus=500
1120 FOR i=1 TO bonus STEP 10
1130 sc=sc+10
1140 LOCATE 13,1:PRINT sc;
1150 SOUND 1,230,5,1,1,1,5
1160 NEXT i
1170 LEV=LEV+1:LOCATE 38,1:PRINT LEV;
1180 a=x:b=y:c=sp:GOSUB 620
1190 x=a:y=b:sp=c
1200 sp=sp+0.025
1210 LX(1)=LX(0):LY(1)=LY(0)
1220 LX(0)=X:LY(0)=Y
1230 PEN 2:LOCATE X,Y:PRINT H$
1240 PEN 3:LOCATE LX(1),LY(1):PRINT T$
1250 MA$(X,Y)="":SO=50
1260 GOTO 340
1270 MODE 1:INK 0,0:BORDER 3:INK 1,26,
    16:INK 2,20:INK 3,14:SPEED INK 6,
    6
1280 PRINT
1290 A$(0)="****  ****  ****  ****  **
    **  ****  ****"
1300 a$(1)="*     *  *  *    *    *
    *  *    *  *"
1310 a$(2)="*     *  *  *    *    *
    *  *    *  *"
1320 a$(3)="*     ****  ****  ****  **
    **  ****  ****"
1330 a$(4)="*     * *   *    *    *
    *     * * "
1340 a$(5)="*     *  *  *    *    *
    *     *  * "
1350 a$(6)="****  *  *  ****  ****  *
    ****  *  *"
1360 FOR i=1 TO 40
1370 PEN 2:LOCATE i,3:PRINT MID$(a$(0)
    ,i,1)
1380 LOCATE i,6:PRINT MID$(a$(3),i,1)
1390 LOCATE i,9:PRINT MID$(a$(6),i,1)
1400 LOCATE 41-i,4:PRINT MID$(a$(1),41
    -i,1)
1410 LOCATE 41-i,5:PRINT MID$(a$(2),41
    -i,1)
1420 LOCATE 41-i,7:PRINT MID$(a$(4),41
    -i,1)
1430 LOCATE 41-i,8:PRINT MID$(a$(5),41
    -i,1)
1440 NEXT I
1450 PEN 2:LOCATE 1,1:PRINT STRING$(40
    ,CHR$(207)):LOCATE 1,11:PRINT STR
    ING$(40,CHR$(207))
1460 PRINT CHR$(22)+CHR$(1)
1470 PEN 3:LOCATE 1,1:PRINT STRING$(40
    ,CHR$(206)):LOCATE 1,11:PRINT STR
    ING$(40,CHR$(206))
1480 PRINT CHR$(22)+CHR$(0)
1490 LOCATE 20,13:PRINT CHR$(240)
1500 LOCATE 20,14:PRINT "I"
1510 LOCATE 18,15:PRINT CHR$(242);"A D
    ";CHR$(243)
1520 LOCATE 20,16:PRINT "K":LOCATE 20,
    17:PRINT CHR$(241)
1530 LOCATE 12,15:PRINT "KEYS:"
1540 LOCATE 5,18:PEN 1:PRINT "by..."
1550 LOCATE 10,19:PRINT "p.b.sedman"
1560 LOCATE 10,24:PRINT "h    t       n
       k   y "
1570 LOCATE 10,25:PRINT "  i       a    y
       e  ";
1580 FOR i=0 TO 26 STEP 0.1:INK 2,i:IN
    K 3,26-i
1590 IF INKEY$<>"" THEN 1660
1600 NEXT i
1610 LOCATE 10,24:PRINT "  i       a    y
       e  "
1620 LOCATE 10,25:PRINT "h    t       n
       k   y ";
1630 FOR i=26 TO 0 STEP -0.1:INK 2,i:I
    NK 3,26-i
1640 IF INKEY$<>"" THEN 1660
1650 NEXT i:GOTO 1560
1660 MODE 0:INK 0,5:BORDER 0
1670 INK 1,20:INK 2,15:INK 3,2:INK 4,8
1680 INK 5,17:INK 6,25:INK 7,0:INK 8,2
    6
1690 INK 9,10:INK 10,19
1700 PEN 9:PRINT STRING$(20,"*")
1710 PEN 10:PRINT "** C r e e p e R **
    *"
1720 PEN 9:PRINT STRING$(20,"*")
1730 PRINT:PRINT
1740 PEN 8:PRINT " The Characters:-"
1750 PRINT:PRINT
1760 PEN 2:PRINT "  ";CHR$(124)+CHR$(1
    24);:PEN 1:PRINT CHR$(126);:PEN 5
    :PRINT " ... ";:PEN 11:PRINT"YOU"
    :PRINT
1770 PRINT:PRINT:PEN 3:PRINT "   ";CHR
    $(128);" ";:PEN 5:PRINT " ... ";:
    PEN 11:PRINT "MUSHROOM"
1780 PRINT:PRINT:PEN 4:PRINT "   ";CHR
    $(129);" ";:PEN 5:PRINT " ... ";:
    PEN 11:PRINT "BEETLE"
1790 PRINT CHR$(22)+CHR$(1):LOCATE 4,1
    5:PEN 9:PRINT CHR$(130):LOCATE 4,
    18:PEN 5:PRINT CHR$(131)
1800 LOCATE 3,21:PEN 6:PRINT CHR$(143)
    +CHR$(143)+CHR$(143):LOCATE 3,21:
    PEN 2:PRINT CHR$(233)+CHR$(233)+C
    HR$(233);:PEN 5:PRINT " ... ";:PE
    N 11:PRINT "FENCE":PRINT CHR$(22)
    +CHR$(0)
1810 PEN 7:LOCATE 1,24:PRINT "PRESS SP
    ACE TO START"
1820 FOR I=0 TO 2000
1830 IF INKEY$=" " THEN 130
```

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```
1840 NEXT I
1850 GOTO 2140
1860 GOSUB 990:MODE Ø:PRINT CHR$(22)+C
     HR$(1):FOR I=1 TO 30 STEP 2:INK I
     /2,I/2:NEXT I
1870 INK Ø,10:BORDER 10
1880 PEN 5:LOCATE 1,1
1890 PRINT STRING$(2Ø,CHR$(143))
1900 PEN 15:LOCATE 1,1
1910 PRINT STRING$(2Ø,CHR$(233))
1920 PEN 1:LOCATE 1,3:PRINT "   C R E
     E P E R "
1930 LOCATE 1,5:PEN 5:PRINT STRING$(2Ø
     ,CHR$(143))
1940 PEN 15:LOCATE 1,5:PRINT STRING$(2
     Ø,CHR$(233))
1950 INK 14,Ø,26:PEN 14:LOCATE 2,9:PRI
     NT "... GAME OVER ..."
1960 PEN 3
1970 PRINT:PRINT:PRINT:PRINT ME$
1980 PEN 6:PRINT:PRINT:PRINT "YOUR SCO
     RE>";SC
1990 LOCATE 1,23::PEN 13:PRINT "   PRE
     SS SPACE BAR "
2000 IF INKEY$<>" " THEN 2000
2010 FOR I=Ø TO 25 STEP Ø.5:PRINT CHR$
     (13):NEXT I
2020 ERASE ma$,sx,sy,dsx,dsy
2030 IF SC<=HI(9) THEN 1660
2040 FOR Z=Ø TO 9
2050 IF SC>=HI(Z) THEN 2070
2060 NEXT Z
2070 FOR I=9 TO Z+1 STEP -1:HI(I)=HI(I
     -1):hi$(i)=hi$(i-1):NEXT I
2080 HI(Z)=SC
2090 MODE 2
```

```
2100 PRINT "          YOUR   SCORE   QUA
     LIFIES   FOR   THE   HALL   OF
      F A M E ."
2110 PRINT:PRINT:LINE INPUT "ENTER YOU
     R NAME (MAX. 5 LETTERS) >";N$
2120 N$=LEFT$(N$,5)
2130 HI$(Z)=N$:GAO=1
2140 MODE Ø:INK Ø,Ø:BORDER Ø
2150 PEN 15:PRINT "--- HALL OF FAME --
     -"
2160 FOR I=Ø TO 15:INK I,I:NEXT I
```

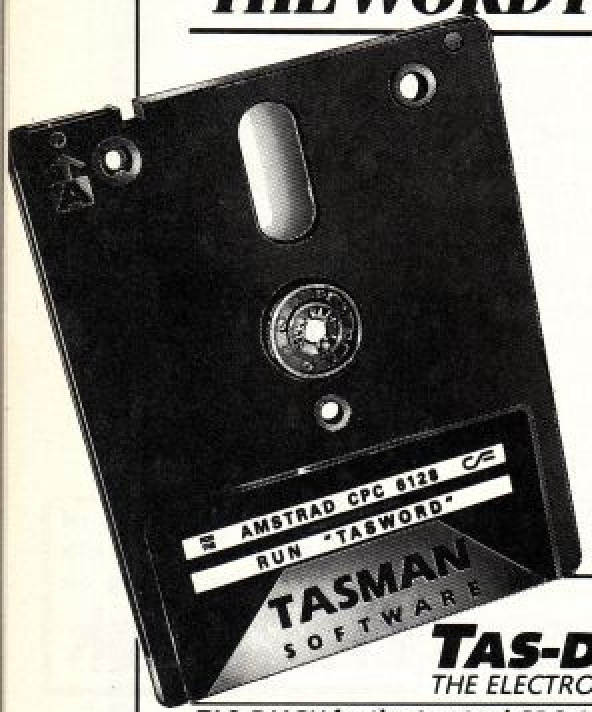
```
2170 FOR I=Ø TO 9:PEN I+2:LOCATE 3,4+(
     I*2)
2180 A$=STR$(HI(I)):A$=RIGHT$(A$,LEN(A
     $)-1)
2190 HI$=STRING$(6-LEN(A$),"Ø")+A$
2200 PRINT HI$;".....";HI$(I)
2210 NEXT I
2220 PRINT CHR$(22)+CHR$(Ø)
2230 PRINT "    PRESS ANY KEY"
2240 IF GAO=1 THEN 2290
2250 FOR I=Ø TO 2000
2260 IF INKEY$<>"" THEN 130
2270 NEXT I
2280 GOTO 1660
2290 IF INKEY$="" THEN 2290
2300 GAO=Ø
2310 GOTO 1660
```

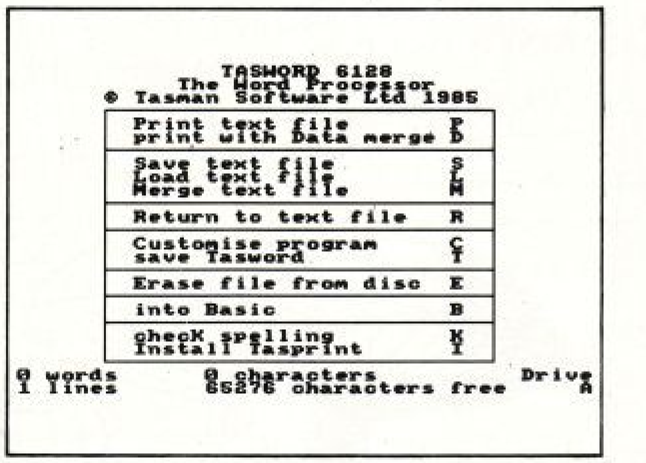


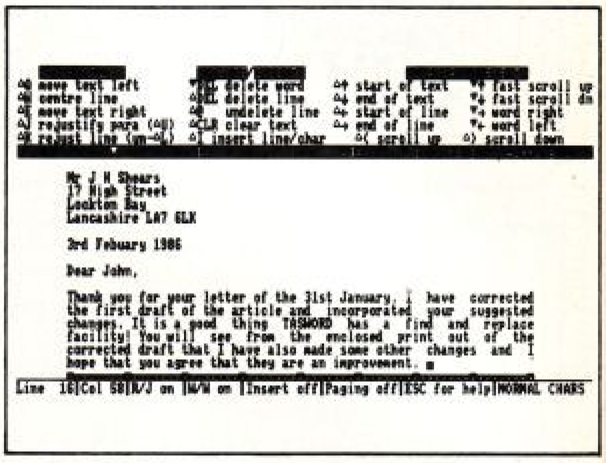
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TASWORD 6128

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A powerful and easy to use word processor and a superb data merge program.
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TASWORD 6128 is the word processor especially developed to utilise the extra memory in the CPC 6128.
The program uses ALL the additional 64K of memory in the CPC 6128 as text space. This means that text files can be around ten thousand words long.
TASWORD 6128 includes a built-in data merge program. Mail merge, in which a letter is printed any number of times, each individually addressed to a different person, is just one of the applications of this powerful facility.
The notepads are a unique feature of TASWORD 6128. Four separate notepads are available. Typing reminders and storing letter headings are just two possible applications for the notepads.
Up to one thousand characters can be stored in ten user definable keys allowing commonly used words, sentences, or even paragraphs to be typed with a single keypress.
TASWORD 6128 has comprehensive customisation features. These allow many of the program facilities to be changed to personal requirements. A customised program can be saved and includes the notepads and user definable keys.
TASWORD 6128 is fully compatible with TAS-SPELL and TASPRINT. It will also read in data from Masterfile 6128. It can even be used to enter and edit your own Basic programs.
With all standard and many extra word processing facilities TASWORD 6128 is the most powerful of the TASWORDS, for the Amstrad CPC computers.

TASWORD 464-D

THE WORD PROCESSOR – WITH MAIL MERGE!

TASWORD 464-D disc £24.95

This is the new TASWORD especially developed to utilise the capabilities of the CPC 464 and 664 disc drives. The additional facilities include a larger text file size and automatic on-screen disc directories during save and load operations. A major new feature is the mail merge facility. This gives multiple prints of your standard letters, forms, etc., with each copy containing, for example, a name and address automatically taken from a disc file containing the data. This data can be entered using TASWORD 464-D, or created using the Masterfile Program Extension package. A powerful and useful conditional printing facility is included – parts of a document can be printed according to user-specified criteria. TASWORD 464-D will only run on, and is only supplied on, disc.

TAS-SPELL

THE SPELLING CHECKER

TAS-SPELL disc £16.50 for the Amstrad CPC 464 and 664 running TASWORD 464-D and for the CPC 6128 running TASWORD 6128

Spelling mistakes and typing errors spoil any document whether it is a private letter or your latest novel. With TAS-SPELL you are free to be creative in the confident knowledge that your spelling won't let you down.
TAS-SPELL checks the spelling of TASWORD 464-D and TASWORD 6128 text files. TAS-SPELL has a dictionary of well over twenty thousand words which it compares with the words in your text. If a word is not recognised then the relevant part of your text is displayed with the suspect word highlighted. You can correct the word, ignore it (it might be a name), or even add it to the TAS-SPELL dictionary.
Please note that TAS-SPELL will only work with TASWORD 464-D and TASWORD 6128.

TASWORD UPGRADES

TASWORD 464 and Amsword owners: send your original cassette or disc (not the packaging) as proof of purchase and £13.90. Your original will be returned together with TASWORD 464-D or TASWORD 6128 on disc.

TASPRINT 464

THE STYLE WRITER

TASPRINT 464 cassette £9.90 disc £12.90

A must for dot-matrix print owners! Print your program output and listings in a choice of five impressive print styles. TASPRINT 464 utilises the graphics capabilities of dot-matrix printers to form, with a double pass of the printhead, output in a range of five fonts varying from the futuristic DATA-RUN to the hand-writing style of PALACE SCRIPT. TASPRINT 464 drives the dot-matrix printers listed below and can be used to print AMSWORD/ TASWORD 464 text files. TASPRINT 464 gives your output originality and style. Completely compatible with the 664 and 6128.

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POPULAR COMPUTING WEEKLY, NOVEMBER 1984

Your 464 becomes a professional standard word processor with TASWORD 464. Supplied complete with a comprehensive manual and a cassette which contains both the program and TASWORD 464 TUTOR. This teaches you word processing using TASWORD 464. Whether you have serious applications or simply want to learn about word processing, TASWORD 464 and the TUTOR make it easy and enjoyable.

TASCOPY 464

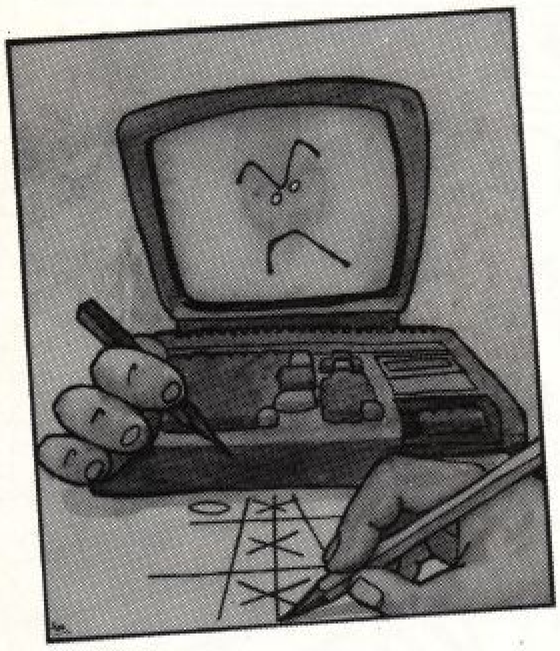
THE SCREEN COPIER

TASCOPY 464 cassette £9.90 disc £12.90

A suite of fast machine code screen copy software for the CPC 464, 664 and 6128. Print high-resolution screen copies in black and white and also large 'shaded' copies with different dot densities for the various screen colours. TASCOPY 464 also produces 'poster size' screen copies printed onto two or four sheets which can be cut and joined to make the poster.

TASPRINT 464 and TASCOPY 464 drive the following dot-matrix printers:

AMSTRAD DMP1	MANNESMANN	STAR DMP501/5/515	SHINWA CP-80
EPSON FX-80	TALLY MT-80	BROTHER HR5	COSMOS-80
EPSON RX-80	BROTHER M1009	DATAC PANTHER	AMSTRAD DMP2000
EPSON MX-80 TYPE III	NEC PC-8023B-N	DATAC PANTHER II	



Artful Arnold

Marcus Jeffries teaches you to teach your computer how to win at noughts and crosses

WHAT is intelligence? Intellect? Brain power? The ability to add two numbers together, play a game of chess, or design a building? All of these could be said to require intelligence, to at least some degree.

Unfortunately, all of these tasks can also be performed by computer, yet we are far from producing what could generally be accepted as a machine possessing artificial intelligence.

Humans are able to use analogy, to relate experience to unknown situations. For example, most people have heard of the game of chess, and have some knowledge of game playing. Even if somebody had never learnt how to play chess, they could eventually pick up some knowledge of the game by watching people play, or even by playing themselves and being told when they played an illegal or poor move.

It would take a long time to pick up such a complicated game as chess. However, you could try something easier, such as Noughts and Crosses.

Imagine you have never played this game before. You are told that it is played on a 3x3 board between two players (O and X), who will alternately place their mark in any available square, with the first player to get a straight line of three winning the game.

You start playing the game and, assuming this really is the first time you have come across it, you will almost certainly lose to the more experienced player. However, over a period of time you will slowly improve, eventually winning or drawing all of your games. Solely by experience, you have managed to improve your performance in a particular well-defined area.

Intelligent matches?

Learning to play Noughts and Crosses was one of the first experiments carried out in machine learning, though interestingly enough, it was not done on a computer.

MENACE (MEchanised Noughts And Crosses Engine) was a collection of matchboxes. Each box had a board position depicted on it and a small slot cut into the front; by not duplicating symmetrical positions, all possible board positions were included without resorting to too many boxes. For example, all of the positions shown in Figure I would be combined into a single box.

The nine possible squares were each assigned a different colour. Then beads depicting the colours of the available squares from each position were placed into the boxes, with an equal number of beads of each colour in any box. Menace was now ready to play.

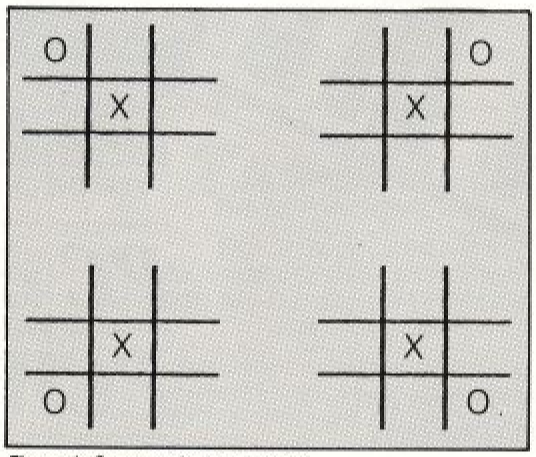


Figure I: Symmetrical positions

When it was time for Menace to make a move, the box depicting the current board position would be tilted forward until a bead dropped through the slot. This colour would decide the square in which Menace would make its move. So it would continue until the end of the game.

If by some chance Menace managed to win, it obviously played some good moves, so all the boxes used in the game would have a bead representing the move played added to them. This increased the likelihood of the move being played again in a future game. Alternatively, if Menace lost, then the reverse would take place, removing a bead of the appropriate colour from each box. Over a period of time, Menace, following the standard learning curve, was able to improve its play to the point where it never lost any games. This was done without being given any explicit tactical knowledge of the game.

With the aid of computers, it is a fairly easy process for us non-smokers to repeat the Menace experiment. The program is shown in Figure II. For simplicity, we have assumed that the computer will always move first, by placing its X in the centre of the board. This reduces the actual number of board positions to a little over 2000. We have made no reduction for symmetrical positions.

If you reply to the central X with one of the corner squares (as in Figure I), the computer will consider each reply as different, even though with rotation they are all the same.

Producing all of these 2000 or so positions can be a very time-consuming task, typically taking a few hours processing before you even start the games.

Making a hash of it

Instead, we will use a process of hashing. This is simply a method by which the information to be stored is coded (through a function) to produce a numerical figure which is used to place the information into storage.

Under normal circumstances, if two different pieces of information produce the same numerical result, subsequent information is simply placed into the next available location following the location where it would normally have been stored.

We have used a slightly different method, so the function will always produce a unique result. This means that we waste some storage space, but it has a number of advantages, including speed and the ability to store board positions only when they are needed, rather than producing them all before the game is played.

We have chosen to store the board positions as strings of eight characters (the middle X is ignored, as this will always be the same). So, for

```
10 DIM positions$(6520),mults%(8),trac
   e%(4,2),wins%(8,3),win$(8)
20 GOSUB 1000
30 :
40 board$="55555555" : mv%=1
50 GOSUB 2000 : GOSUB 6000
60 IF fin%=-99 THEN GOSUB 3000 : GOSUB
    2000 : GOSUB 6000
70 IF fin%=-99 THEN GOSUB 4000 : GOSUB
    5000
80 IF fin%=-99 THEN 50
90 PRINT"Play Again ? ";
100 GOSUB 7000
110 IF ans$="Y" OR ans$="y" THEN 40
120 GOSUB 8000
130 STOP
140 :
1000 REM *** initialise ***
1010 RESTORE
1020 FOR i% = 1 TO 8 : READ mults%(i%)
     : NEXT i%
1030 DATA 1,3,9,27,81,243,729,2187
1040 FOR i% = 1 TO 8
1050 FOR j% = 1 TO 3
1060 READ wins%(i%,j%)
1070 NEXT j%,i%
1080 DATA  1,2,3,  4,5,6,  7,8,9
1090 DATA  1,4,7,  2,5,8,  3,6,9
1100 DATA  1,5,9,  3,5,7
1110 FOR i% = 0 TO 6520
1120 positions$(i%) = ""
1130 NEXT i%
1140 RETURN
2000 REM *** print board ***
2010 brd$ = ""
2020 FOR i% = 1 TO 8
2030 IF MID$(board$,i%,1)="X" THEN brd
     $=brd$+"X":GOTO 2060
2040 IF MID$(board$,i%,1)="O" THEN brd
     $=brd$+"O":GOTO 2060
2050 brd$=brd$+"."
2060 NEXT i%
2070 brd$ = LEFT$(brd$,4)+"X"+RIGHT$(b
     rd$,4)
2080 CLS
2090 PRINT LEFT$(brd$,3);"      123"
2100 PRINT MID$(brd$,4,3);"      456"
2110 PRINT RIGHT$(brd$,3);"      789"
2120 PRINT
2130 RETURN
3000 REM user input & validation
3010 PRINT"Type move (1-9) --> ";
3020 GOSUB 7000
3030 IF ans$<"1" OR ans$>"9" THEN 3400
3040 a% = VAL(ans$)
3050 IF MID$(brd$,a%,1)<>"." THEN 3400
3060 IF a%>5 THEN a%=a%-1
3070 board$ = LEFT$(board$,a%-1) + "O"
     +MID$(board$,a%+1)
3080 RETURN
3400 PRINT"  ! Illegal Entry !"
3410 GOTO 3000
4000 REM *** find hash value ***
4010 hash% = 0
4020 FOR i% = 1 TO 8
4030 hash%=hash%-mults%(i%)*((MID$(boa
     rd$,i%,1)="O")+(2*(MID$(board$,i%
     ,1)="X")))
4040 NEXT i%
4050 IF positions$(hash%)="" THEN posi
     tions$(hash%)=board$
4060 RETURN
5000 REM Get best scre. Trace & Update
5010 high% = -99
5020 FOR i% = 1 TO 8
5030 IF MID$(positions$(hash%),i%,1)="
     O" THEN 5100
5040 IF MID$(positions$(hash%),i%,1)="
     X" THEN 5100
5050 score% = VAL(MID$(positions$(hash
     %),i%,1))
5060 IF score%>high% THEN high%=score%
     :ps%=i%
5100 NEXT i%
5110 trace%(mv%,1) = hash%
5120 trace%(mv%,2) = ps%
5130 mv% = mv% + 1
5140 board$ = LEFT$(board$,ps%-1) + "X
     " + MID$(board$,ps%+1)
5150 RETURN
6000 fin% = 0
6010 IF INSTR(brd$,".") THEN fin%=-99
6020 FOR i% = 1 TO 8
6030 win$(i%)=MID$(brd$,wins%(i%,1),1)
     +MID$(brd$,wins%(i%,2),1)+MID$(br
     d$,wins%(i%,3),1)
6040 NEXT i%
6050 FOR i% = 1 TO 8
6060 IF win$(i%) = "OOO" THEN fin%=-1
6070 IF win$(i%) = "XXX" THEN fin%=+1
6080 NEXT i%
6090 IF fin%=-1 THEN PRINT"YOU WIN"
6100 IF fin%= 0 THEN PRINT"DRAWN GAME"
6110 IF fin%=+1 THEN PRINT"I WIN"
6120 IF fin%=-99 THEN RETURN
6130 FOR i% = 1 TO mv%-1
6140 t1%=trace%(i%,1)
6150 t2%=trace%(i%,2)
6160 v% = VAL(MID$(positions$(t1%),t2%
     ,1))
6170 v% = v% + fin%
6180 IF v%<0 OR v%>9 THEN 6200
6190 positions$(t1%) = LEFT$(positions
     $(t1%),t2%-1)+RIGHT$(STR$(v%),1)+
     MID$(positions$(t1%),t2%+1)
6200 NEXT i%
6210 RETURN
7000 REM *** get single key input ***
7001 ans$ = ""
7010 ans$=INKEY$ : IF ans$=""THEN 7010
7020 PRINT ans$;
7030 RETURN
8000 REM *** save experience array ***
```

Figure II

example, the board position in Figure III would be shown as:

XO.XOO..

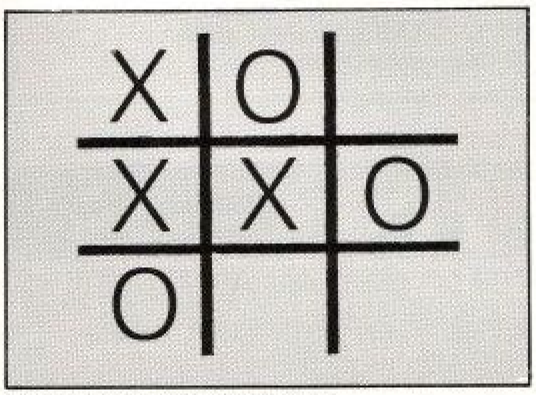


Figure III: Example board position

We can now code this board into a unique number by allocating:

'.' = 0
'O' = 1
'X' = 2

then multiplying these values by 1, 3, 9, 27, and further multiples of three, depending on their position within the string. So, for example, the above position would result in the hash number:

```
  X (2*1) + O (1*3) + . (0*9)
+ X (2*27) + O (1*81)
+ O (1*243) + . (0*729) + . (0*2187)
  = 383
```

This is then used to store/look-up the board position in the array positions$. It can be seen that during the course of a game, the largest number ever produced will be:

(1*1)+(1*3)+(1*9)+(1*27)+(2*81)+(2*243)+(2*729)+(2*2187) = 6520

so this is the DIMension of the array. Do not worry too much about running out of space on the computer, because only about one third of the array elements will ever be used as legal positions, each of which containing eight characters.

We also need to hold a list of numbers (the number of beads in the Menace model) representing the probabilities of moves being chosen. Instead of using valuable space by having a separate array of values, numbers in the range zero to nine will be placed into the positions shown by dots in the above representation.

Initially, these are all set to 5, but they are modified up or down, depending on the outcome of each game.

Rather than generate all the possible positions before starting the game, the positions$ array begins empty. As positions occur, the hash function is calculated and if the array element is empty, this must be the first time the position has been seen. If this is the case, the current board position (with 5s for scores) is placed into the location.

Running the program

To try the program, type it in as given and run it. You will be shown a board, with an X in the middle, and be prompted for a move in the range one to nine (a second representation of the board, showing these numbers, is given).

Type in your move, which will be checked for

legality. If everything is OK, the board will be updated, the computer will reply, then you will again be prompted for a move.

At the end of the game, the computer will print "You win", "Drawn game" or "I win", and you will be asked whether you want to play "Again?". If you want to play another game, just type Y and a new game will start

Remember that the computer cannot play the game properly to begin with, so you will have to play it a number of times before it starts to make sensible moves. For instance, if you start by playing the moves 1, 4, then 7, you will win the game easily. Type Y to play again and try the same sequence – this time the computer will stop you.

Further expansion

There are a couple of modifications which you may like to make to the program. At present, the computer slowly builds up its knowledge during a session, then promptly forgets everything when you switch off – well, how would you like to be switched off?

Interested readers may like to write a couple of routines to save and load the positions$ array to tape or disc, so that at the start of a new session, the computer can load its previous "experience".

As written, the routine to choose a move simply searches through the list of scores contained in the board position and selects the highest. This is not quite the same way as the Menace bead system worked.

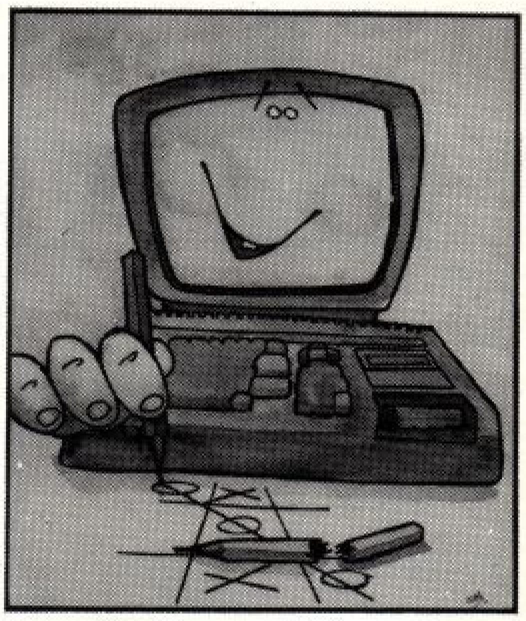
Purists will prefer to add up the total of all the scores, then generate a random number between one and this total. Then by counting through the values in the board position until the total exceeds the random number, a move can be chosen.

This method makes the program play more varied, but takes the learning process longer, as poor moves are only slowly sifted out of the system.

The OXO program represents a fairly simplistic learning experiment, and could only barely be said to exhibit intelligence, but it does show how a basic punish/reward strategy can work.

The same technique is used when trying to teach mice to run about a maze. If they take the wrong route they are punished, say, with a small electric shock. Alternatively, when they find the correct route, there's a piece of cheese waiting as reward.

This sort of process may seem remote from human learning. In most cases it has proved to be very inefficient to attempt to emulate human thought processes by computer, but instead to use the machine's strengths, such as fast processing speed. Nevertheless, the Menace simulation does provide an interesting experiment, and points the path to future learning systems.



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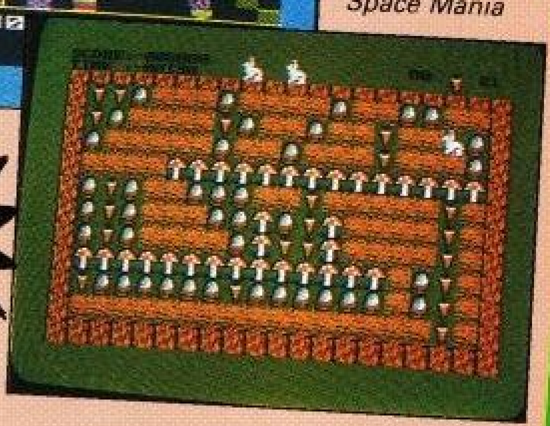
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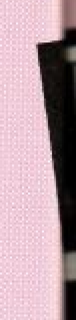
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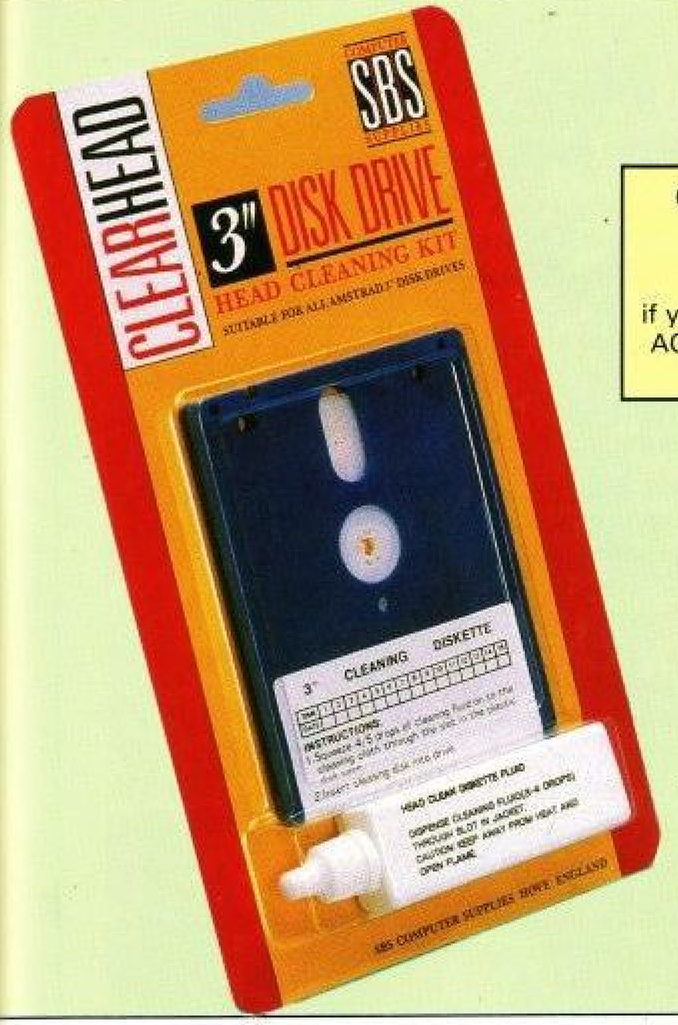
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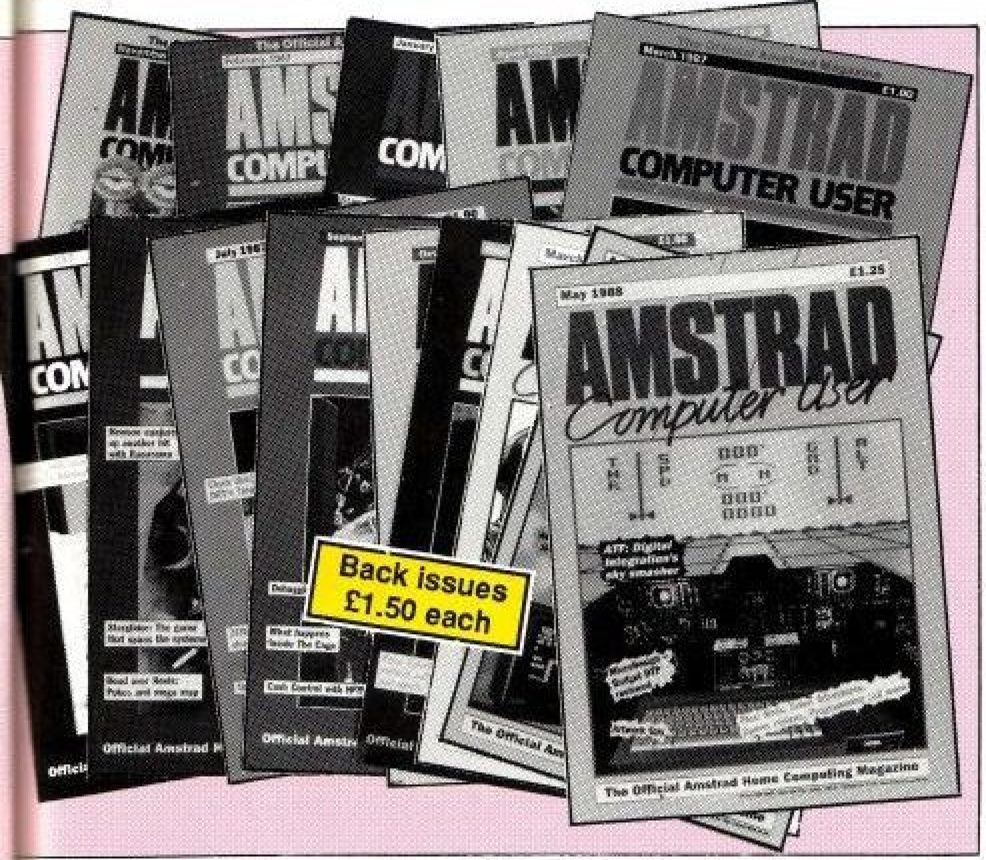
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The Least Significant Bit

READERS' problems are often our problem. Not the kind of things David Foster deals with where he tells us to take two copies of Protext and ring again in the morning. We are more worried about letters like the one marked "Strictly Private and Confidential", addressed to the editor which ask the presumably secret questions "Can you recommend a spell checker for LocoScript". His answer was "Yes, I can".

Best of all are times when letters indicate that someone has got hold of the wrong end of the stick. The reader who complained that he got the error message "Type mismatch in 60", and still couldn't get the program to work when he had typed "mismatch" into line 60

Hot on the secret

ROBERT Goode has featured in this page before, noted for his hard disc fitting exploits. This superhero was sent to man the Amstrad stand at the Hanover Messe.

In a bid to break into the field of industrial espionage our Goode man crept up to the Epson stand and procured a sample output from the LQ4800, a dot matrix printer which has a 48 pin head and produces a higher resolution than a laser printer but which costs more than a cheap laser. Robert's mole within Epson who supplied this document was probably a leggy blonde employed to dish out such leaflets.

The Hanover Messe is large – there is a bus service to take you from hall to hall – and it is as much an office equipment show as a computer show. One of the displays was of shredding machines "Well", said Robert, "I only had this one bit of paper and I wanted to see how the machine worked". A fine spy he turned out to be.

Cool in the snow

ANOTHER Amstrad employee who has risen to fame through the pages of LSB is David Hyams, the company solicitor, perhaps the friendliest person in the Amstrad building. LSB has got to say that or else he'll sue. David is something of a speed freak and took a winter holiday in the mountians of Austria, staying in the same hotel as our less courageous editor. David made a name for himself, and not only by conquering black runs with ease and seriously damaging a leg. He proved that he is the match for any Jamaican Olympic team by riding a five man bobsleigh.

New innards for Arnold

GOOD news. It's supposed to be secret, but Amstrad is re-designing the circuit board for the CPC. We won't see the new machines this year, but it shows Amstrad's commitment to the Arnold extends way beyond the time that some doomwishers would have you believe. The redesigned machines should not be any different as far as the user is concerned. It will look and feel the same, it will run all the same programs. But it will have fewer chips on the PCB and cost Amstrad less to make. The reduction in components should enhance the CPC's already enviable reliability record.

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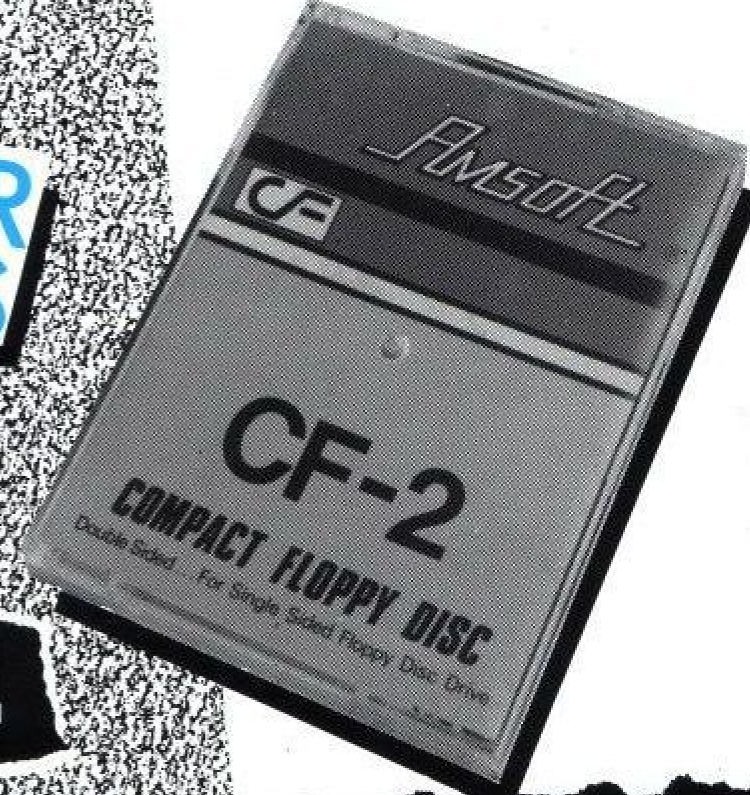
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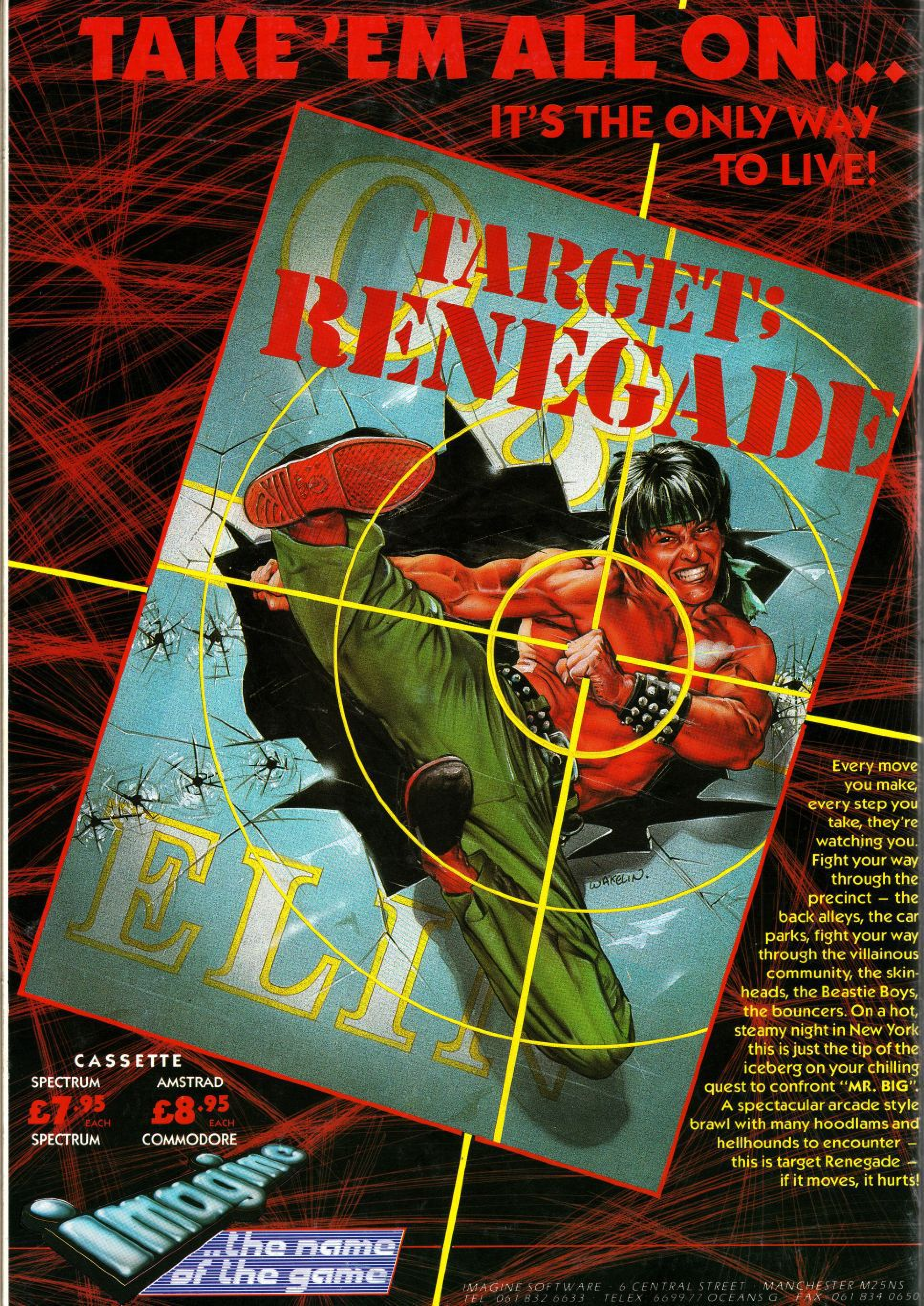
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